

UNIVERSIDAD DEL VALLE

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# Actividades Complementarias Asistidas por Tecnología

## Ciencias e Ingenierías I (Science and Engineering I)

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# Actividades Complementarias Asistidas por Tecnología

Ciencias e Ingenierías I  
(Science and Engineering I)

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Colección Ingeniería

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# Introducción

El proyecto Actividades Complementarias Asistidas por Tecnología nace ante la iniciativa de crear un libro de texto digital que pueda apoyar los procesos de enseñanza y aprendizaje de lenguas extranjeras en los cursos de inglés con fines generales y académicos de la Universidad del Valle.

Este libro de texto ha sido adaptado para funcionar con la plataforma de licencia libre Moodle 3,5 y está alojado en el Campus Virtual de la universidad. Las actividades sirven como apoyo a las clases y están a disposición tanto para los docentes de la sección LEFGA como para sus estudiantes.



# Actividades

## complementarias asistidas por tecnología

### Introducción

El presente libro de texto digital ha sido creado como material complementario para los cursos de inglés con fines generales y académicos de las Facultades de Ciencias Naturales y Exactas, Ingenierías, Salud, Humanidades y Artes Integradas de la Universidad del Valle, con proyección a ser utilizado también en las diferentes sedes regionales de la Universidad.

Este libro ha sido diseñado teniendo en cuenta la modalidad de aprendizaje semipresencial (Blended Learning) con un enfoque por tareas (Task-Based Learning) utilizando la plataforma de licencia libre Moodle 3.5, por lo cual, es compatible con diferentes dispositivos tales como tablets, celulares y computadores.

Para su organización, las actividades han sido agrupadas en diferentes módulos divididos, a su vez, en dos niveles, un primer nivel pensado para los cursos del ciclo de fundamentación y un segundo nivel para el ciclo de profundización. Estas actividades se encuentran en el área de CURSOS NO REGULARES del Campus Virtual, así:

- |                                    |                                                                         |
|------------------------------------|-------------------------------------------------------------------------|
| <b>1.</b> Science & Engineering I  | <b>5.</b> Social Sciences & Art I                                       |
| <b>2.</b> Science & Engineering II | <b>6.</b> Social Sciences & Art II<br>(En desarrollo)                   |
| <b>3.</b> Health I                 | <b>7.</b> Sciencies Humaines I<br>(En desarrollo / Módulo para francés) |
| <b>4.</b> Health II                |                                                                         |

Cabe resaltar que todos los temas de las actividades han sido escogidos de manera que sean transversales a las diferentes áreas de estudio, por lo cual, aunque cada módulo va dirigido a ciertas facultades, esto no los excluye de poder ser usados en programas académicos de otras facultades.

Es importante recordar que el material NO ha sido pensado como curso virtual y, por lo tanto, es necesario el acompañamiento del docente para su desarrollo. Este material no reemplaza, por ningún motivo, un curso o una clase.





# Actividades Complementarias Asistidas por Tecnología para cursos LEFGA

## Ciencias e Ingenierías I

### INTRODUCTION

The activities offer students and teachers appropriate material for exploring different levels of an **EAP-ESP** class in different disciplines of the **Science and Engineering**. They can be used for autonomous practice or supporting material for the class. There are **12 activities** to explore, each one divided into 3 sections: **preparation**, **development**, and **closure**. The first section will explore the students' prior knowledge; the second section provides the opportunity for learning the language by using it in context within a specific topic which is relevant and interesting for the student scope of study. Finally, the closure section aims to expand what the students have learned throughout the previous sections.





## ACTIVITY 1: THE SCIENTIFIC METHOD

### Objectives

- To skim through a text to identify keywords and understand main ideas.
- To reach a detailed understanding of a paragraph.

### Preparation



#### 1. Activating Prior Knowledge

Read the activity below. You will be asked to organize the steps of the scientific method.

### Scientific Method

A) Based on your logic and on your previous knowledge, organize in a logical sequence the pictures below. (From 1 to 6)



B) Do you think the sequence of the Scientific Method could vary? If so, write your own sequence in English. You may discuss the answers with your classmates and your professor.





## Development



### 2. Reading Comprehension

- A) Read and listen to the text *Scientific Method*.  
B) Based on the reading, do the next activity.

## Scientif Method



(1) Rutherford's experiment to test the "cookie" model of the atom represents an elegant example of how science progresses. All science begins with experiments and observations. After collecting enough data, scientists suggest a theory that explains **their** observations. A good scientific theory does more than explain known facts; **it** also predicts results of new experiments. Scientists return to the laboratory to test the predictions made by the theory. If the tests match the predictions of the theory, confidence in the theory increases. However, if the test gives results that do not agree, the theory must be discarded or at least revised so that it agrees with the new results as well as the previous ones.

(2) Experiments that showed the electrical nature of the atom led to the "cookie" model, **which** was developed to explain the presence of positively and negatively charged particles within the atom. The model predicted that projectiles such as alpha particles should pass directly through a thin foil of atoms. Rutherford's experiment was designed to test **this prediction**. In this case the theory failed spectacularly.

(3) However, in the failure of one model are the seeds of a more successful one. The new model had to retain positive and negative parts of the atom because experiments showed clearly that atoms contain **such parts**. A new model, which proposed that the atom has a positively charged core called the nucleus, is **what** finally emerged. This nuclear model of the atom explained both the positive and negative parts of the atom and Rutherford's scattering results.

(4) The nuclear model has been developed in quantitative detail and leads to many additional predictions about how atoms and nuclei behave. Physicists have performed many experiments to test these predictions, and **they** have all been verified. Consequently the nuclear model is firmly established as a correct view of atomic architecture.

Olmsted III, J. & Williams, G. (1997). *Scientific Method* [Box 2-1]. In: *Chemistry: the molecular science* (2nd ed., p. 57). Iowa: C. Brown Publishers.



# Scientific Method



## ACTIVITY

Answer the questions based on the text **Scientific Method**.

1. Based on your previous reading, organize the words taking into account the description given.

1. A piece of information that is known to be true.  
(Plural)

S-T-A-F-C

2. To get rid of something (Throw away).

I-S-D-R-A-C-D

3. To get things of the same type from different places and bring them together.

L-E-C-L-C-O-T

4. A way of doing something that is successful or useful and therefore worth copy.

L-E-M-D-O

5. Knowledge about the physical world, especially based on examining, testing, and providing facts.

S-C-N-E-I-C-E

6. A small flat sweet cake.

O-O-C-I-K-E

7. The smallest part of an element that can exist alone or combine with other substances to form molecules.

M-O-T-A



# Scientific Method



2. Go back to the text *Scientific Method*, check the words in bold and analyze them. Then, choose and mark with an **X** the right option of the questions below.

In paragraph (1), **their** is referring to:

Scientists \_\_\_\_ Experiments \_\_\_\_ Theory \_\_\_\_

In paragraph (1), **it** is referring to:

Facts \_\_\_\_ Results \_\_\_\_ Scientific Theory \_\_\_\_

In paragraph (3), **such parts** is referring to:

Atom \_\_\_\_ Positive and negative parts of the atom \_\_\_\_ New model \_\_\_\_

In paragraph (4), **they** is referring to:

Physicists \_\_\_\_ Experiments \_\_\_\_ Predictions \_\_\_\_

3. Read the following statements and decide whether they are **TRUE** or **FALSE** according to the reading.

- The prediction of the "cookie" model succeeded according to Rutherford's experiment.
- The nuclear model of the atom failed due to its explanation of the positive and negative parts within the atom.

TRUEFALSE

TRUEFALSE

4. Match each paragraph with the piece of information found in it.

- A) The nuclear model improvement.
- B) Some of the steps in the Scientific Method and the way to follow according to its results.
- C) The lack of success of a model is not necessarily a failure; it can be the beginning of a better model.
- D) The "cookie" model did not achieve its prediction.

PARAGRAPH 1 \_\_\_\_

PARAGRAPH 2 \_\_\_\_

PARAGRAPH 3 \_\_\_\_

PARAGRAPH 4 \_\_\_\_



## Closure



### 3. Listening Comprehension

Watch the video ***The Scientific Method***. Then, answer a few questions based on the video.



Scan this QR code to watch the video!



Teacher's Pet. (2014). The scientific method [Video]. Retrieved from <https://www.youtube.com/watch?v=SMGRe824kak>

1. What is the definition of scientific method? Fill the blanks with the right word to complete the definition given in the video (00:20 - 00:27):

question

produce

results

process

The Scientific Method is just a [blank], or steps taken, to [blank] reliable [blank] to answer a specific [blank].

2. The steps of the scientific method are observation, research, hypothesis, experiment, conclusion, and share results. According to the video:

- 1) What steps from the scientific method can you go back and repeat?
- ☐ All of them      ☐ None of them      ☐ It does not say
- 2) Typically, after conducting an experiment the results...
- ☐ bring more questions      ☐ are enough to answer all the questions      ☐ are hard to identify
- 3) The two steps from the scientific method that are going on the entire time are...
- ☐ observation and research      ☐ observation and conclusion      ☐ research and experiment

3. Read the following statement and decide whether it is **TRUE** or **FALSE**.

- The Scientific Method is only performed by people from the scientific area.

TRUE

FALSE



# What is Chemistry?



## ACTIVITY 2: WHAT IS CHEMISTRY?

### Objectives

- To apply different reading strategies.
- To reach a detailed understanding of a paragraph.

## Preparation



### 1. Activating Prior Knowledge

#### THE IMPORTANCE OF CHEMISTRY

Watch the video *Importance of Chemistry in Life*.



Scan this QR code to watch the video!



Binogi. (2014). Importance of Chemistry in Life, Everyday Uses [Video]. Retrieved from: <https://www.youtube.com/watch?v=L2Q2q20KaEk>

### 1. Read the following statements and decide whether they are **TRUE** or **FALSE**.

1) Chemistry is important in everyday life because we interact with chemical reactions all the time.

TRUE

FALSE

2) You must be a chemist to understand the changes around us caused by chemical reactions.

TRUE

FALSE

3) The video defines the term "chemistry".

TRUE

FALSE

4) Few things that are in our environment are made of chemicals.

TRUE

FALSE

5) The video describes all the chemical reactions that occur when preparing a cake.

TRUE

FALSE

6) According to the video, all man-made chemical substances affect the environment.

TRUE

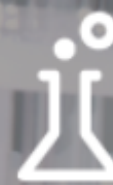
FALSE

7) It is necessary to study chemistry to obtain sustainable chemicals without affecting the natural world.

TRUE

FALSE

# What is Chemistry?



## Development



### 2. Reading Comprehension

- A) Read and listen to the text *What is Chemistry?*  
B) Based on the reading, do the next activity.

## What is Chemistry?



**(1)** Science, in the broadest sense, can be viewed as our continuing attempt to organize and describe the properties of nature. Because this is an infinitely vast subject, science is subdivided into various disciplines, such as chemistry, biology, geology, and physics. Chemistry is the branch of science that studies the properties and interactions of matter. Chemists seek to understand how chemical transformations occur by studying the physical and chemical properties of matter. Because of the broad scope of chemistry, the interests of chemists often become intertwined with those of physicists, biologists, and geologists. Other scientists also study systems in which chemistry plays an important role. Thus many nonchemists are interested in chemistry.

**(2)** All scientific disciplines, including chemistry, share the complementary goals of description and prediction. One major goal of scientists is to develop theories that describe as many different observations as possible. An equally important aim is the extension of those theories to predict properties that have not yet been observed. Scientists also use theories to predict the outcomes of experiments that have never been performed.

**(3)** Chemists explore the infinite variety of chemical behavior, and they use simplifications and generalizations to organize what they find. A common practice is to construct a theory in which a few principles describe how a system behaves. The theory can be used to predict what will happen to the system under different conditions. Chemists design and perform experiments that test whether or not a system behaves as the theory predicts. If observations and experiments verify the predicted outcomes, the chemists become confident that theory correctly describes how nature behaves.

**(4)** According to the atomic theory, all matter is composed of tiny particles called atoms. The atomic theory was developed at the beginning of the nineteenth century to explain the observations of early chemists. It was quickly found that new chemical discoveries were consistent with predictions based on the theory. Over the years the atomic theory has been expanded and refined as increasingly sophisticated chemical experiments revealed more detailed information about matter.

Olmsted & Williams. 1997. *What is Chemistry?*. Chemistry The molecular Science. (p 3-4) Iowa. Wm. C. Brown Publisher



# What is Chemistry?



## ACTIVITY

Answer the questions based on the text *What is Chemistry?*

1. How does the author define **chemistry**? Organize the following words to form a definition for chemistry.

Chemistry  the  that  
 the properties and   
of .

interactions

are

branch of science

is

studies

matter

study

Tip.  
Take a  
look at the  
first  
paragraph.

2. Analyze the following derived words in the table below.

Tip.  
You can use  
the origin of  
the word  
section in  
dictionary.com  
to discover the  
answer.

| Derived words | Root                 | Suffix               |
|---------------|----------------------|----------------------|
| 1. Organize   | organ                | -ize                 |
| 2. Biologists | <input type="text"/> | <input type="text"/> |
| 3. Equally    | <input type="text"/> | <input type="text"/> |
| 4. Chemical   | <input type="text"/> | <input type="text"/> |
| 5. Behavior   | <input type="text"/> | <input type="text"/> |

# What is Chemistry?



3. Match each piece of information with the paragraph where it can be found.

Paragraph 1 ●

- ☐ a) Chemists devise and perform experiments in order to prove if a system behaves in the same manner the theory predicts it.

Paragraph 2 ●

- ☐ b) The importance of chemistry in all areas of knowledge and its influence in other professions.

Paragraph 3 ●

- ☐ c) Matter composition and the importance of atom and the atomic theory developments.

Paragraph 4 ●

- ☐ d) Scientists' objective is to develop theories and extend them to predict properties that have not been observed.

4. Decide if the following statements are **TRUE** or **FALSE**, according to the reading.

- The first paragraph defines biology, geology, and physics.

TRUE

FALSE

- Scientists use theories in order to prognosticate the results of experiments.

TRUE

FALSE

- Chemists explore a huge sort of ways that chemicals behave.

TRUE

FALSE

- The atomic theory was developed early in the 18th century.

TRUE

FALSE

- The improvement of the atomic theory is due to chemical advances in laboratories.

TRUE

FALSE



# What is Chemistry?



## Closure



### 3. Listening Comprehension

Watch the video ***Science Experiment: Baking Soda in Glove***. Then, answer the questions below.



Scan this QR code to watch the video!



Crawford, B. (2012). Science experiment baking soda in glove [Video]. Retrieved from: <https://www.youtube.com/watch?v=3wksU52NBA0>

#### 1) How many materials are needed for the previous experiment?

Select the right option:

- A. 1 and 3
- B. 3 and 4
- C. 5 and 6
- D. Exactly 3

#### 2) What type of text is this experiment?

Select the right option:

- A. Historical - Narrative - Descriptive
- B. Instructional - Classification - Definition
- C. Descriptive - Cause/Effect - Instructional
- D. Argumentation - Cause/Effect - Contrast

#### 3) How many gases are mentioned in the video?

Select the right option:

- A. 1
- B. 2
- C. 4
- D. 5



## ACTIVITY 3:

### USING CHEMISTRY TO FEED THE WORLD

#### Objectives

- To make predictions based on images and titles.
- To skim through a text, and find main ideas, concepts and definitions.
- To recognize word formation and derivation.

## Preparation



### 1. Activating Prior Knowledge

#### USING CHEMISTRY TO FEED THE WORLD

Look at the pictures below and then answer the questions.



By SuSanA Secretariat [CC BY 2.0 (<http://creativecommons.org/licenses/by/2.0>)], via Wikimedia Commons. Retrieved from: [https://mn.wikipedia.org/wiki/%D0%A4%D0%B0%D0%B9%D0%BB:Reuse\\_of\\_urine\\_demonstration\\_-\\_fertilised\\_and\\_not\\_fertilised\\_tomato\\_plant\\_experiment\\_\(3617543234\).jpg](https://mn.wikipedia.org/wiki/%D0%A4%D0%B0%D0%B9%D0%BB:Reuse_of_urine_demonstration_-_fertilised_and_not_fertilised_tomato_plant_experiment_(3617543234).jpg)

### 1. What is the difference between them?

- ☐ In the picture number one, the plants were fertilized; in the picture number two, they were not.
- ☐ The seeds used for the plants in the picture number one were more expensive than the seeds for the plants number two.
- ☐ The plants in the first picture were irrigated; the plants in the second were not.

### 2. What do farmers need to grow better plants according to the pictures?

- ☐ The plants of the second picture need more irrigation.
- ☐ They need to use fertilizers in their crops.
- ☐ They need to use more expensive seeds.



# Using Chemistry to Feed the World



## Development



### 2. Reading Comprehension

- A) Read and listen to the text *Using Chemistry to Feed the World*.  
B) Based on the reading, do the next activity.



## Using Chemistry to Feed the World



(1) Ammonium nitrate and other fertilizers are immensely important to humanity. Primitive people raised crops on a plot of land until the nutrients in the soil were exhausted. Then they would move on to new ground, where they would burn all of the natural vegetation and begin farming again. This slash-and-burn method of growing food is still used extensively in South America, where farmers are destroying vast tracts of rain forest.

(2) Fertilization using animal products has been practiced since ancient times. Animal manure returns nutrients to the soil, replenishing elements that were depleted as crops were grown and harvested. It is likely that the use of such fertilization followed quickly on the heels of the domestication of animals such as goats, sheep, and cattle. According to legend, the first European settlers in the United States were taught by the Native Americans to use fish as a fertilizer for corn.

(3) Crop yields can rise dramatically with the use of commercial fertilizers. For example, in 1800 an acre of land in the United States produced about 25 bushels of corn. In the 1980s the same acre of land produced 110 bushels. Worldwide, approximately 4 billion acres of land are used to grow food crops. This would probably be enough land to feed the world's population if the entire acreage could be commercially fertilized. It has been estimated that world crop production would increase by about 50% if about \$40 per acre were spent to apply modern chemical fertilizers. However, it would cost about 160 trillion dollars to produce this additional food. Furthermore, the use of chemical fertilizers can lead to the contamination of rivers and bays with phosphates and nitrates.

(4) Agriculture requires fertilizers because as plants grow, they remove various chemical elements from the soil. In a fully contained ecosystem, decaying organic matter replenishes these elements, but the material in crops that are harvested and shipped elsewhere is not recycled. Thus intensive agriculture inevitably depletes the soil of essential elements, which must be replaced by fertilization.

(5) Many elements are required by growing plants. Those required in the greatest amounts are nitrogen, phosphorus, and potassium, but plants also need trace amounts of calcium, copper, iron, zinc, and other elements. By far the most substantial need is for nitrogen. The Earth's atmosphere is 80% molecular nitrogen, but  $N_2$  cannot be used by plants. Instead, most plants absorb nitrogen from the soil in the form of nitrate ions.

(6) The production of nitrogen fertilizers is one of the primary activities of the chemical industry. Every year, the top 20 chemicals in industrial production in the United States include five nitrogen-containing compounds whose major use is in fertilizers. Molecular nitrogen, which serves as the primary source of nitrogen for chemical production, ranks second perennially. Ammonia, which is synthesized from  $N_2$  and  $H_2$ , ranked sixth in 1995. Ammonia is injected directly into the ground, where it dissolves in moisture in the soil. In slightly acidic soil, ammonia is converted to ammonium ions and eventually into nitrate ions. Ammonia is also an intermediate for the production of other fertilizers. Nitric acid, which reacts with ammonia to produce ammonium nitrate, was in fourteenth place. Ammonium nitrate and urea, both of which are primarily used as fertilizers, ranked fifteenth and seventeenth.

(7) The production of fertilizers from molecular nitrogen is very energy intensive. In the United States alone, hundreds of millions of barrels of oil are used every year to produce fertilizers. As world supplies of petroleum are depleted and as the Earth's population steadily increases, society will be forced to develop more efficient ways to make fertilizer. Genetic engineering offers a promising solution. There is a remarkable bacterium that lives in the roots of leguminous plants such as soybeans, peas, and peanuts. This organism can convert molecular nitrogen into ammonia. The plant and the bacterium have a symbiotic relationship. Ammonia produced by the bacterium nourishes the plant, and the plant provides other nutrients to the bacterium. Exactly how the bacterium converts nitrogen to ammonia is the subject of vigorous research. Scientists hope eventually to transfer the bacterial gene responsible for the conversion of nitrogen to ammonia into the cells of non-leguminous plants.

*Olmsted & Williams. 1997. Using Chemistry to Feed the World. Chemistry The molecular Science. (p 115) Iowa. Wm. C. Brown Publisher*

Answer the questions based on the text ***Using Chemistry to Feed the World.***

-ly      non-      -al      -tion      in-

-er      -ship      -an      -teenth



# Using Chemistry to Feed the World



## 2. Select the right answer.

### 1) What was the method used by primitive people to grow food?

- ☐ Primitive people moved from one land to another looking for productive soils
- ☐ The land was used until it was depleted
- ☐ They cleaned the forest to grow their food
- ☐ All of the above

### 2) How did primitive people fertilize land?

- ☐ They used animal waste as nutrients for the land
- ☐ They began to produce chemical fertilizers
- ☐ They used fish to fertilize all of their crops
- ☐ None is correct

### 3) What does the increasing use of fertilizers can lead to?

- ☐ Contamination
- ☐ More investment
- ☐ More production in the same extension of land
- ☐ All of the above

### 4) What are *fertilizers*?

- ☐ Chemical nutrients that can be reused
- ☐ Essential elements of the soil
- ☐ Chemical nutrients which replace natural elements
- ☐ None is correct

### 5) What do growing plants need?

- ☐ Phosphorus, potassium, calcium, copper, iron zinc, nitrate ions and other elements
- ☐ Calcium, copper, iron, zinc and N<sub>2</sub>
- ☐ Just nitrogen, phosphorus and potassium
- ☐ All of the above

# Using Chemistry to Feed the World



3. Write if the statement is **TRUE** or **FALSE** according to the information in **paragraphs 6th and 7th**.

- One of the main uses of nitrogen-containing compounds in the U.S. is for making fertilizers.
- Ammonium is used to produce Ammonia.
- A bacterium could contribute to the production of ammonia, then to the production of fertilizers.
- The way the bacteria produce ammonia is a process that the genetic engineers can easily explain.

|      |       |
|------|-------|
| TRUE | FALSE |
| TRUE | FALSE |
| TRUE | FALSE |
| TRUE | FALSE |

4. Find a word in the reading that matches each definition given in this exercise.

The number in between the parentheses refers to the paragraph where the answer can be found.

Manure

Bacterium

Exhaust

Contamination

None

Poisonous or dirty substances that are polluting the water, air, or land somewhere. (4)

To use up or consume completely. To deplete totally. (1)

Manure

Bacterium

Exhaust

Contamination

None

Manure

Bacterium

Exhaust

Contamination

None

Excrement, especially of animals used as fertilizer (2)

One-celled organism, spherical, spiral, or rod shaped and appearing singly or in chains (7)

Manure

Bacterium

Exhaust

Contamination

None



# Using Chemistry to Feed the World



5. Analyze the following noun phrases and write the nucleus of each one.

1) This slash-and-burn method of growing food.

.....

2) The contamination of rivers and bays with phosphates and nitrates.

.....

3) One of the primary activities of the chemical industry.

.....

4) The production of fertilizers from molecular nitrogen.

.....

6. Analyze the highlighted words in the following sentences.

- Using **chemistry** to feed the world.
- The use of **chemical** fertilizers can lead to the contamination of rivers and bays with phosphates and nitrates.
- Ammonium nitrate and other **fertilizers** are immensely important to humanity.
- **Fertilization** using animal products has been practiced since ancient times.
- This would be probably enough land to feed the world’s population if the entire acreage could be commercially **fertilized**.

Now, complete the table with the information required. Look for the meanings of the words and suffixes in the dictionary. In the column of **Grammatical Category** specify if you think it is a *noun*, an *adjective* or *none*.

| WORD          | SUFFIX               | GRAMMATICAL CATEGORY |
|---------------|----------------------|----------------------|
| Chemistry     | Chemist + -ry        | <div></div>          |
| Chemical      | Chemist + -          | <div>Adjective</div> |
| Fertilizers   | Fertilize + -        | <div></div>          |
| Fertilization | <div></div> + -ation | <div></div>          |
| Fertilized    | <div></div> + -ed    | <div></div>          |

7. Choose the statement that best summarizes the reading.

- ☐ The primary activity of the chemical industry is the production of nitrogen fertilizers to grow more and better quality food.
- ☐ Genetic engineers are studying a bacterium that can convert molecular nitrogen into ammonia. Ammonia is an intermediate for the production of some fertilizers needed in the production of food.
- ☐ Human dependence on chemicals to produce food for a growing population in the world has forced man to look for alternative sources to fertilize nutrient depleted lands.

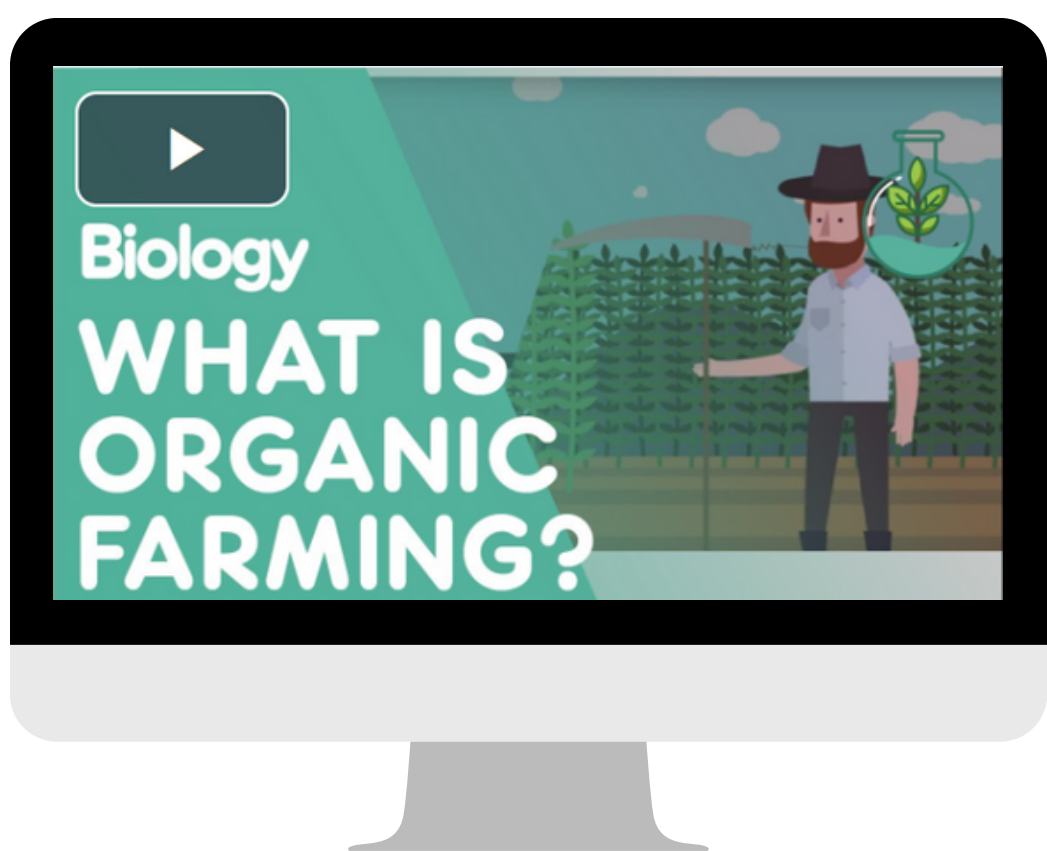


## Closure



### 3. Listening Comprehension

Watch the video ***What is organic farming?*** Then, answer the questions below.



Scan this QR code to watch the video!



FuseSchool - Global Education. (2016). What is organic farming? [Video]. Retrieved from: <https://www.youtube.com/watch?v=WhOrIUrnPo>

According to the video, write if the following statements are **TRUE** or **FALSE**:

- Because of the ever-growing population, the farming practices have faced changes to meet the need of food.
- Organic farming is the most used farming method nowadays.
- Organic farming is an alternative to conventional agriculture for helping to overcome the climate change crisis.
- Organic farming uses manure instead of chemical fertilisers.
- Organic farming was developed after the Industrial Revolution.

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE

TRUE

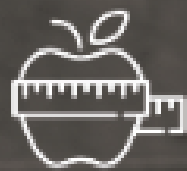
FALSE

TRUE

FALSE



# Human Energy Requirements



## ACTIVITY 4: HUMAN ENERGY REQUIREMENTS

### Objectives

- To recognize word formation and derivation.
- To look for family of words in a dictionary.

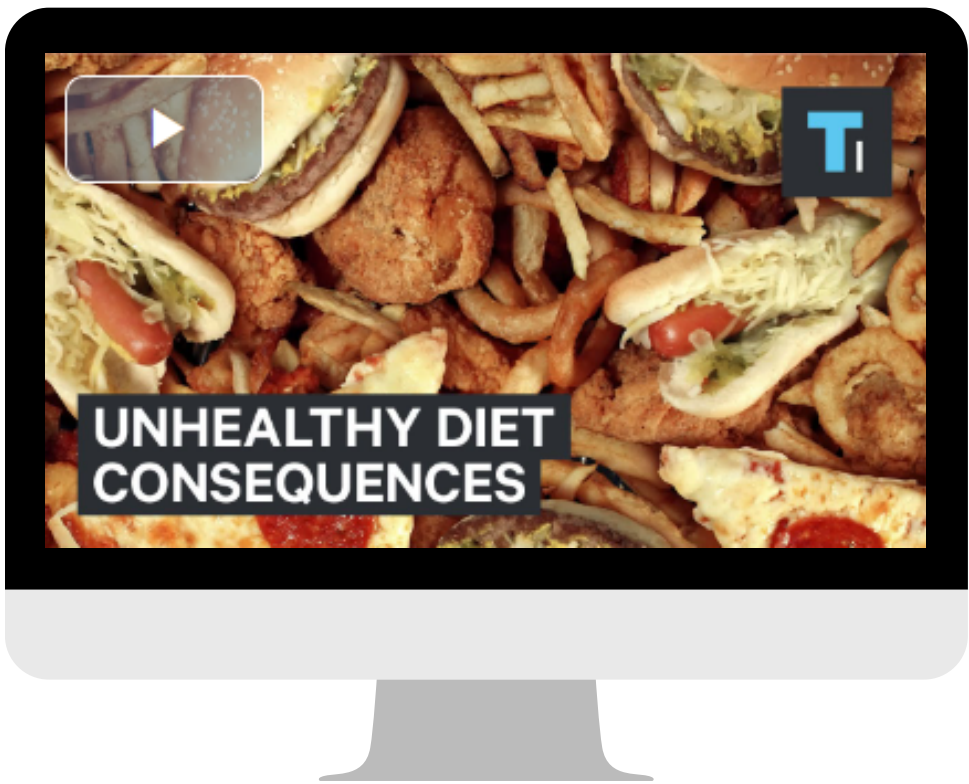
### Preparation



#### 1. Activating Prior Knowledge

#### UNHEALTHY DIET

You will watch a short video about the consequences of an unhealthy diet. Then, organize the ideas below according to the sequence of the video. Follow the example.



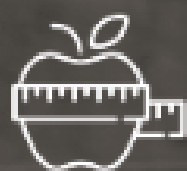
Scan this QR code to watch the video!



Tech Insider. (2015). Unhealthy Diet Consequences [Video]. Retrieved from: <https://www.youtube.com/watch?v=JY4wFitoAqk>

- What a Virginia Tech Study shows related to eating fatty food. ☐
- Scientists suppose other effects in your body sugar level. ☐
- Glucose is used by your muscles or it is stored for later use. ☐
- Research findings. ☐
- Glucose levels increase in your bloodstream. ☐
- After a short period of time, your muscles are affected by the fatty diet. ☐
- Eating fatty food has adverse effects in your health such as obesity and weight increase. ☐
- Time periods you are exposed to have a large intake of fatty food. ☐





## Development



### 2. Reading Comprehension

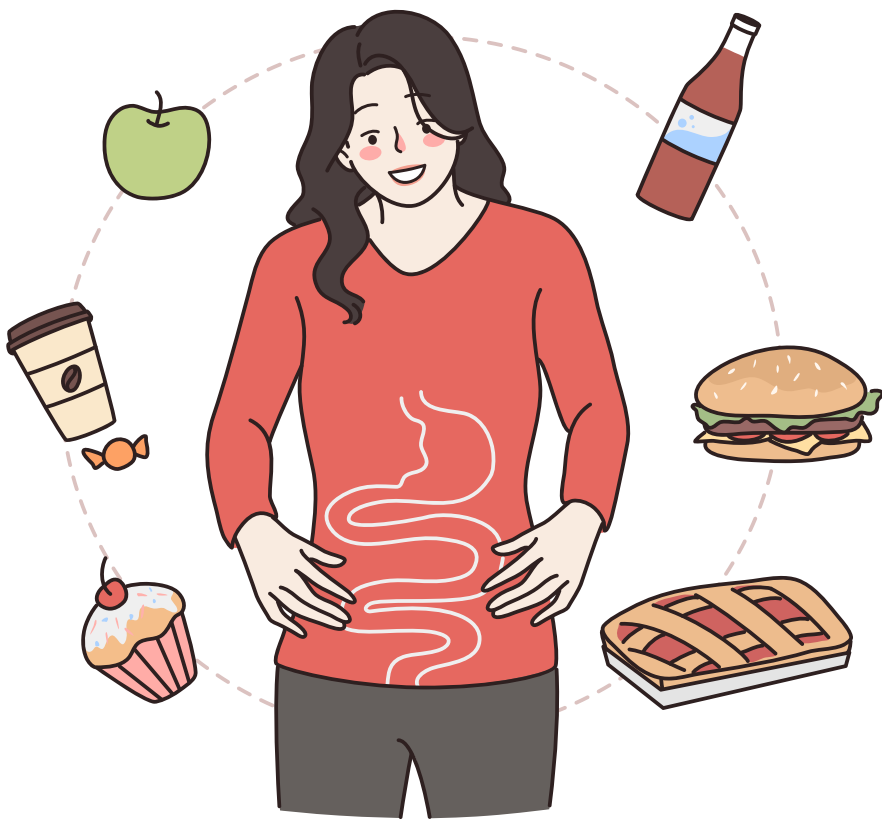
- A) Read and listen to the text *Human Energy Requirement*.  
B) Based on the reading, do the next activity.

## Human Energy Requirement



**(1)** A person's weight depends on how much energy is taken in and how much energy is expended. Food brings stored chemical energy into the body. Digestion releases this chemical energy. Some energy is transferred out of the body as work and heat, but when energy intake exceeds immediate needs, the extra energy is stored as fat.

**(2)** To lose weight, people must take in less energy than their bodies require. When this happens, the body “burns” fat to meet its energy requirements. Individuals can modify their bodies' energy balance by eating less and by exercising more.

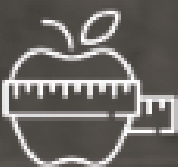


**(3)** “Eat less and exercise more” is overly simplistic for three reasons. First, foods of various types have different energy contents. Second, exercise of various types requires different amounts of energy. Third, individuals of various metabolic types process foods with different efficiencies.

**(4)** Foods can be grouped into types, each with a characteristic energy content. Fats (energy content = 39 kJ/g) are most energy rich. Carbohydrates (16 kJ/g) and proteins (17 kJ/g) are the other main sources of energy. Vegetables and fruits contain much water but very little fat, so its energy content per gram is low. Margarine is mostly fat, so its energy content per gram is extremely high. The table below lists the average energy content (in kJ/g and Cal/oz) for some foods.



# Human Energy Requirements



| Energy Content (1 kJ/g =6,78 Cal/oz |        |          | Energy Consumed (kJ/hr; 4.186 kJ = 1 Cal) |               |               |                |
|-------------------------------------|--------|----------|-------------------------------------------|---------------|---------------|----------------|
| Type of food                        | (kJ/g) | (Cal/oz) | Activity                                  | Body weight   |               |                |
|                                     |        |          |                                           | 55 kg(120 lb) | 70 kg(155 lb) | 85 kg (185 lb) |
| Green vegetables                    | 1.2    | 8        | Resting                                   | 290           | 335           | 380            |
| Beer                                | 2.0    | 14       | Driving an automobile                     | 440           | 500           | 560            |
| Fruits                              | 2.5    | 17       | Doing housework                           | 650           | 750           | 850            |
| Low-fat yogurt                      | 4.5    | 30       | Walking at 4km/hr                         | 770           | 880           | 990            |
| Broiled chicken                     | 6.0    | 40       | Walking at 6 km/hr                        | 1090          | 1250          | 1410           |
| Regular yogurt                      | 10     | 68       | Bicycling at 9 km/hr                      | 775           | 880           | 985            |
| Bread, cheese                       | 12     | 80       | Bicycling at 20 km/hr                     | 2400          | 2760          | 3120           |
| Ground beef                         | 16     | 110      | Playing tennis or volleyball              | 1380          | 1590          | 1800           |
| Sugar                               | 16     | 110      | Skiing at 16 km/hr                        | 2175          | 2510          | 2825           |
| Margarine                           | 30     | 200      | Running at 16 km/hr                       | 3285          | 3770          | 4245           |

(5) What is eaten is as important as how much is eaten. For example, 10 g of margarine provides the same energy content as 250 g of green vegetables. A 100-g serving of low-fat yogurt, moreover, contains less than half the energy of a 100-g serving of regular yogurt. The easiest way to reduce energy intake is by eliminating fats and greasy foods such as hamburgers and pizza.

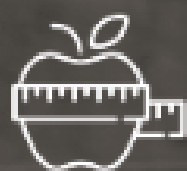
(6) Energy intake is only part of the equation. Energy balance can also be adjusted through the amount and type of exercise. Various forms of exercise require different average energy outputs. Exercise involves doing thermodynamic work, and as the following table indicates, the amount of work depends not only on the type of exercise, but also on the amount of mass being displaced.

(7) A simple example illustrates the relative importance of diet and exercise in weight control. Most soft drinks contain about 9% sugar, so a 340-g can of a soft drink contains about 31 g of sugar. Virtually all the remaining content is water, which has no energy content. Sugar provides 16-kJ/g, so the total energy content of a can of soft drink is 490 kJ. To expend 490 kJ of energy, a 70-kg person must walk at 6 km/hr for **23 minutes**, play tennis or volleyball for **18 minutes**, run at 16 km/hr for **8 minutes**, or rest and watch television for 1 ½ hours. A 100-g (about a ¼-pound) hamburger on a bun contains 1600 kJ of energy. Thus a 70-kg person has to play volleyball continuously for **over an hour** to burn off the energy contained in a hamburger and soft drink.

(8) This comparison demonstrates that it is much easier to control energy balance through diet than by exercise. One additional comparison reinforces this point. The human body stores excess energy in fatty tissues. When half a kilogram of this fatty tissue is consumed, it releases 20,000 kJ of energy, which is enough to fuel about 9 hours of tennis, 6 hours of skiing, or 4 hours of strenuous running. (Page 579)

Olmsted & Williams. (1997). Human Energy Requirements [Box 12-1]. In: Chemistry the Molecular Science. (2nd Ed., p 579) Iowa. Wm. C. Brown Publisher.

# Human Energy Requirements



## ACTIVITY

Answer the questions based on the text *Human Energy Requirements*.

1. The following concepts or terms are related to vocabulary from the text. Match each definition with the concept it belongs.



1) All the definitions were taken from [www.wordreference.com](http://www.wordreference.com) 2) All the photos were taken from [www.pixabay.com](http://www.pixabay.com)

1) A nourishing substance eaten or drunk to sustain life, provide energy, and promote growth.

2) The capacity or power for vigorous activity.

3) Any of a class of substances made of carbon, hydrogen, and oxygen, including starches and sugars

4) A molecule that is a large portion of the mass of every life form, composed of amino acids linked in long chains.

5) A butter-like product made of vegetable oils.

6) Any plant whose fruit, seeds, roots, tubers, bulbs, stems, leaves, or flower parts are used as food.

7) A baked, open-faced pie consisting of a thin layer of dough topped with tomato sauce and cheese.

8) A sweet, crystalline substance made especially from sugarcane and the sugar beet.

9) A beverage that is not alcoholic and is usually carbonated, such as ginger ale.

Pizza

Vegetable

Soft drink

Energy

Carbohydrate

Margarine

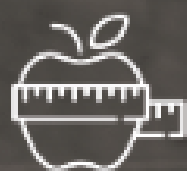
Food

Sugar

Protein



# Human Energy Requirements



2. Write the paragraph number (1, 2, 3, 4, 5, 6, 7, or 8) where the following information is found or referred.

Paragraph .....

A) Illustrates the importance of diet and exercise in weight control.

Paragraph .....

B) What people should do to lose weight.

Paragraph .....

C) Refers the content of energy of margarine and green vegetables.

Paragraph .....

D) Concludes that a well-defined exercise system helps you to control energy balance.

Paragraph .....

E) How foods are classified into several types based on their energy contents.

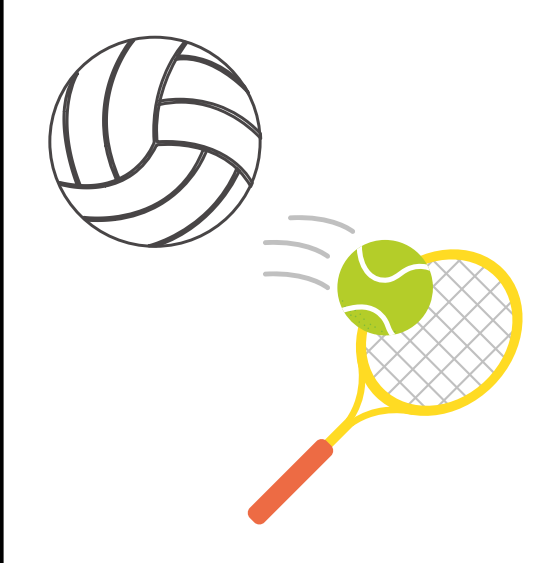
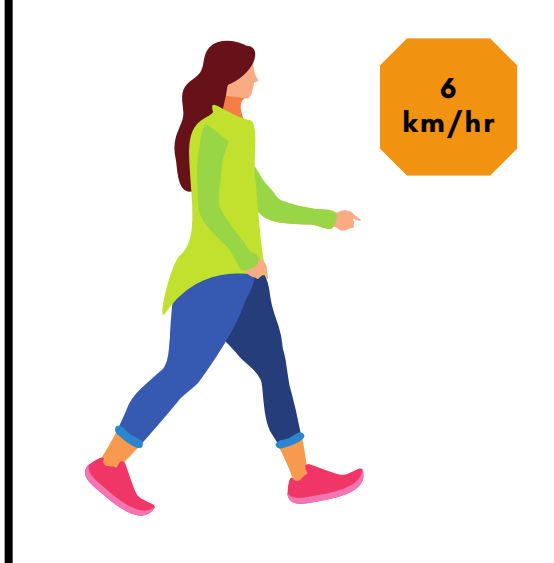
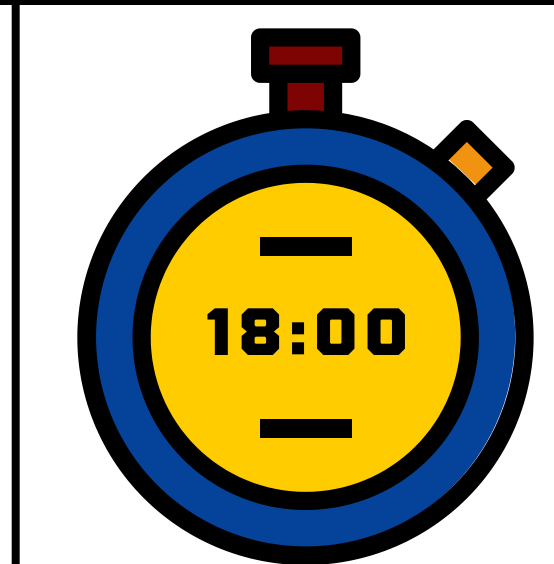
Paragraph .....

F) Three reasons you should consume less food and exercise more.

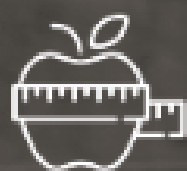
Paragraph .....

G) Energy balance and type of exercise.

3. Diet and exercise are important in weight control. Match each activity with the time required to expend energy, according to paragraph 7.

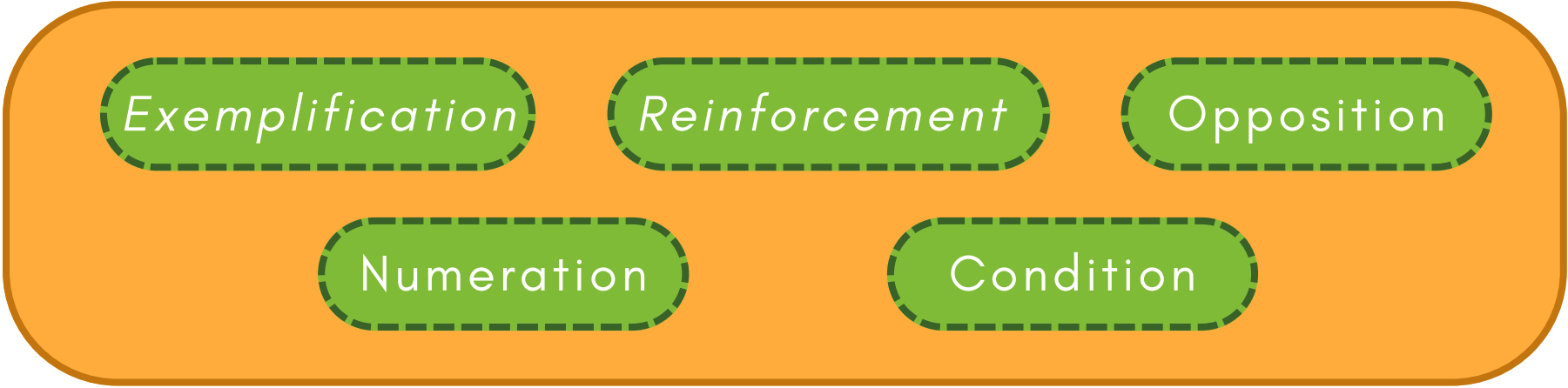
|                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |  |
| A                                                                                   | B                                                                                   | C                                                                                     | D                                                                                     |
|  |  |  |  |
| 1) .....                                                                            | 2) .....                                                                            | 3) .....                                                                              | 4) .....                                                                              |

# Human Energy Requirements



4. Analyze the connectors and then write the function they have in the text.

Tip: For more information about connectors, [click here](#) and check the study guide by the Birmingham City University.



- 1) But
- 2) For example, such as, a simple example
- 3) Moreover
- 4) First, second, third
- 5) When

### Active Voice

The subject is a doer.

It shows a direct relation between the subject and the verb.

Alyssa writes a book

### Passive Voice

The focus is on the object.

It can be also used when the subject is unknown or obvious. When the agent is mentioned, it is stated after the preposition "by".

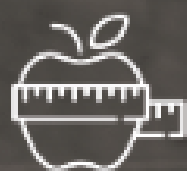
A book is written by Alyssa

5. Decide whether the following sentences are in **active** or **passive** voice. Write **ACTIVE** or **PASSIVE** in the blank.

- Digestion releases this chemical energy.
- What is eaten is as important as how much is eaten.
- The extra energy is stored as fat.
- Foods can be grouped into several types.
- A simple exercise illustrates the relative importance of diet and exercise in weight control.
- The human body stores excess energy in fatty tissues.
- Energy balance can also be adjusted through the amount and type of exercise.
- Various forms of exercise require different average energy outputs.



# Human Energy Requirements



## Closure



### 3. Listening Comprehension

Watch the video *Exercise VS Diet*. Then, answer the questions below.



Scan this QR code to watch the video!



AsapScience. (2016). Exercise vs Diet [Video]. Retrieved from: <https://www.youtube.com/watch?v=ztiHRIFXtoc>

1) Organize the following information according to the sequence of the video. (1, 2, 3, 4, 5, 6, 7 & 8)

- It compares the number of calories in a chocolate bar.
- A research carried out with children and adults
- Effects of a combination of diet and exercise.
- Importance of exercise vs diet when losing weight.
- Results of exercises in your body and importance of focusing on a diet.
- How to burn 200 calories.
- Compares physical activity between industrial and developing world.
- Diets have an important role to lose weight.

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2) Based on the text *Human Energy Requirements* and the previous video decide whether the following statements are true or false.

- The video refers a classification of food in fats, carbohydrates, and proteins.
- Only the text refers the term KJ/g
- This text and the video contain similar information related to lose weight.
- This text and the video refer several ways to eliminate calories.
- Both texts refer the effects of soft drink in a diet.

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE



## A horizontal sequence of six images illustrating the evolution of tools. From left to right: 1. A simple, irregularly shaped stone flake. 2. A stone flake attached to a wooden handle. 3. A stone flake with a green patina, possibly copper, attached to a wooden handle. 4. A long, thin, pointed knife with a wooden handle. 5. A folding knife with a wooden handle and a single blade extended. 6. A red Swiss Army knife with multiple tools extended, including blades, a saw, a corkscrew, and pliers.

[https://commons.wikimedia.org/wiki/File:Evolucion\\_navajas\\_victorinox.jpg#/media/File:Evolucion\\_navajas\\_victorinox.jpg](https://commons.wikimedia.org/wiki/File:Evolucion_navajas_victorinox.jpg#/media/File:Evolucion_navajas_victorinox.jpg)

[illegible]



# Knives and Steel



## Development



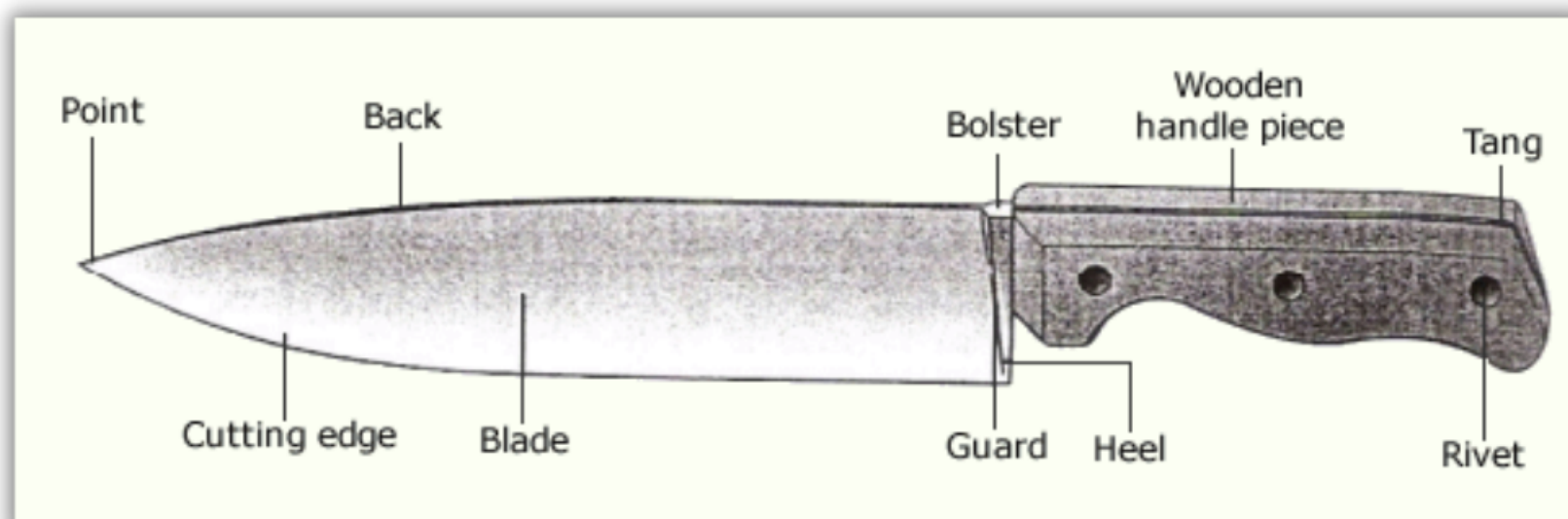
### 2. Reading Comprehension

- A) Read and listen to the text *Knives and Steel*.  
B) Based on the reading, do the next activity.

## Knives and Steel



**(1)** A dull knife is useless in the kitchen –you might as well tear a tomato or a loaf of crusty bread apart by hand. But sharpening a knife isn't always easy because some knives take edges better than others. While there are many knives that simply won't stay sharp, a few wonderful knives never seem to dull. Though they are all made of steel, there is clearly something different about their blades.



**(2)** Knives have always been one of the greatest tests of a steelmaker's skill, from the days when swordmaking was an art to the present era of science and technology. A knife's blade must be tough and flexible, while its cutting edge must be hard but not brittle. Giving steel these properties requires great control over its composition and processing. To understand a knife blade, you must understand its steel.

## Stresses and strains, bends and breaks

**(3)** Knives are simple tools that we use to cut things into pieces. They are essentially wedges that use mechanical advantage to convert small forward forces into large separating forces. When you push down on the blade of a knife as you cut a carrot (**Fig. 17.1.1**), its cutting edge penetrates the carrot while the two inclined surfaces of the blade exert huge horizontal forces on the two halves of the carrot. One half moves to the left while the other half moves to the right and the carrot divides neatly in half.

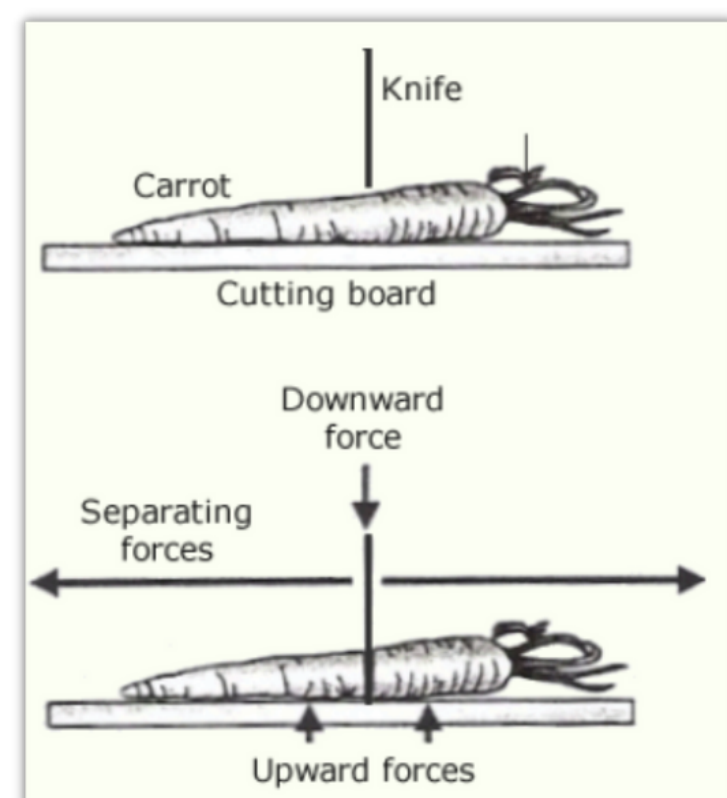
**(4)** But while the mechanical action of cutting is simple, the physical structure of the knife is not.

The secret to its ability to cut through the carrot lies in the properties of its blade. This blade is almost certainly made of steel, so the story of how a knife works is really the story of how steel works.

**(5)** Steel is not a specific material but rather a whole range of iron based metals. These metals differ from one another in their specific chemical compositions and in how they have been processed. The variety of steels is so broad that it's difficult to encompass them all in a single definition. However steels are generally mixtures of iron and other elements that contain no more than 2.06% carbon by weight. A mixture with more carbon than this is usually called cast iron. It's an unfortunate historical accident that cast irons actually contain more carbon and less elemental iron than many steels.

**(6)** Carbon content is important in distinguishing steel from cast iron because it affects the hardness, brittleness, and other characteristics of these metals (**Fig. 17.1.2**).

Hardness is a measure of a material's resistance to penetration, deformation, abrasion, and wear. Brittleness is the tendency for a material to fracture while it's being deformed. A good knife blade should be hard but not brittle; distorting very little as you push it through the carrot but resisting fracture even if you use the knife to open a metal can.



**Fig. 17.1.1** When you push down on a knife to cut a carrot, the cutting board pushes up. Overall, the vertical forces on the carrot, including its weight, cancel completely. But the ramp-like surfaces of the knife blade create large horizontal forces on the two halves of the carrot and these forces divide the carrot.



**Fig. 17.1.2** Soft, low-carbon steel bends easily while hard, carbon-rich steel breaks instead of bending.



# Knives and Steel



## ACTIVITY

Answer the questions based on the text ***Knives and Steel.***

1. Match the best definition for each one of the following words.

KNIFE

IRON

SHARPENER

BRITTLE

HARDNESS

CARBON

A) A cutting instrument consisting of a sharp-edged often pointed blade of metal fitted into a handle or onto a machine.

B) To make or become sharp or sharper.

C) It is a measure of how resistant solid matter is to various kinds of permanent shape change when a force is applied.

D) An element combined with other elements in all organic matter, and found in a pure form as diamond and graphite.

E) A silver-white metallic element, used in some forms for making steel, tools, implements, machinery, etc., and also found in tiny quantities in food and in blood.

F) Having hardness and stiffness but breaking easily; easily damaged; frail.

All the definitions were taken from [www.wordreference.com](http://www.wordreference.com)

2. Based on the reading, mention at least three characteristics of a good knife blade.



#1

.....

.....

.....

.....

.....

#2

.....

.....

.....

.....

.....

#3

.....

.....

.....

.....

.....

# Knives and Steel



3. Write the paragraph number to the following ideas.

Paragraph .....

A) Carbon content is important to determine steel's characteristics such as hardness and brittleness which serve to distinguish a knife's blade quality.

Paragraph .....

B) Knife's ability for cutting depends on the blade which is made of steel; in other words, for understanding how knife works, it is necessary to understand how steel works first.

Paragraph .....

C) When cutting small objects, knives take a mechanical advantage that converts small forces into separating forces.

Paragraph .....

D) Steel is a mixture of different iron-based metals. This mixture allows a wide variety of steels to be obtained by using different chemical components and processes.

Paragraph.....

E) Some knives take better edges than others because of their blades.

Paragraph .....

F) A good knife's blade must be tough and flexible, while its edge must be hard and unbreakable. For steel having these characteristics, there should be a great control over its composition and processing.

4. According to the reading, answer if the following statements are **TRUE** or **FALSE**.

- A good knife's blade must be dull and soft.
- The composition and process to produce steel are the key to make good knives.
- The action of cutting is a complicated mechanical process.
- Steel is an alloy of iron, carbon and other elements.
- Cast iron contains more carbon than steel does.

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE



# Knives and Steel



5. Write the nucleus of the following nominal phrases. The **number** refers to the paragraph the nominal phrase can be found.

2

A) One of the greatest tests of a steelmaker's skill.

2

C) Small forward forces into large separating forces

3

B) Its cutting edge

3

D) Huge horizontal forces on the two halves of the carrot

5

E) A whole range of iron-based metals

5

G) An unfortunate historical accident

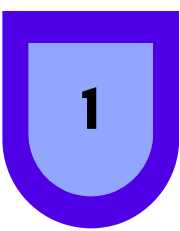
5

F) Their specific chemical compositions

6

H) A good knife blade

6. Select the correct translation for the -ing ending verbs. The number refers to the paragraph where the word can be found.



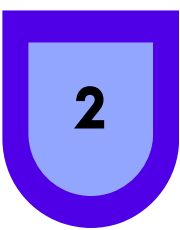
1) Sharpening

- ☐ Afilado
- ☐ Afilando
- ☐ Afilar



2) Cutting

- ☐ Cortante
- ☐ Corte
- ☐ Cortando



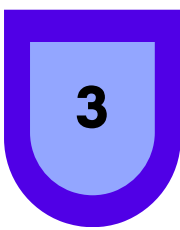
3) Giving

- ☐ Dar
- ☐ Dando
- ☐ Da



4) Processing

- ☐ Procesamiento
- ☐ Procesa
- ☐ Procesando



5) Separating

- ☐ De separación
- ☐ Separando
- ☐ Separar





## Closure



### 3. Listening Comprehension

Watch the video ***How It's Made Kitchen Knives*** and then answer the questions below.



Scan this QR code to watch the video!



Sinhuja Sinthu. (2013). How its Made Kitchen Knives [Video]. Retrieved from: <https://www.youtube.com/watch?v=CpuE6A-c2WA>

1) Why has producing knives become a science?

2) What is the water's function during this process?

3) Why is different the automatic process for a bigger blade?



[illegible]





## Development



### 2. Reading Comprehension

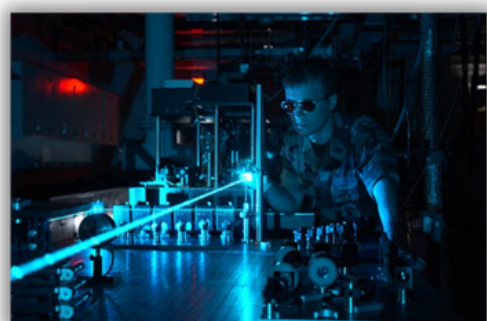
- A) Read and listen to the text *Lasers*.  
B) Based on the reading, do the next activity.

## Lasers

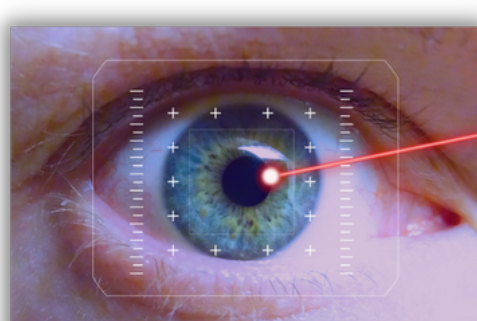


**(1)** In the right combination, atoms and light combine to create one of the most remarkable tools of modern technology, the laser. Since its invention in 1960, the laser has evolved from a scientific curiosity into a remarkable tool. It is used not only for advanced scientific research, but also for many commercial applications, ranging from laser light shows to fiber optics communications to surgical techniques.

**(2)** A laser is a device in which atoms and light interact to generate a beam of light having very precisely defined properties. The term "laser" is an acronym for light amplification by stimulated emission of radiation. In simple terms, when a sample of atoms (or molecules) is "pumped" uphill in energy, light of a specific wavelength (color) may interact with the atoms or molecules to produce more light of that wavelength. If mirrors are present to reflect the light back into the sample, then the process can repeat itself many times, amplifying the intensity of the light by an immense amount.



By US Air Force [Public domain], via Wikimedia Commons



[CC0 Public Domain] via Pixabay



By Intel Free Press [CC BY-SA 2.0] via Wikimedia Commons



By ESO/V. Calçada/N. Rasinger (skysurvey.org), (<http://www.eso.org/public/images/ann14012a/>) [CC BY 4.0], via Wikimedia Commons

**(3)** Light from a laser differs from conventional light in several ways. Laser light is monochromatic - has a single color whereas conventional light sources typically produce light of many colors. A laser is highly directional, whereas conventional sources send light in all directions. Laser light has coherence, which means that the entire beam of laser light moves in the same phase. In contrast, light from conventional sources has a distribution of phases. These features -one wavelength, one direction, one phase- mean that laser light is more highly organized than light from normal sources. Many of the applications of lasers take advantage of this high degree of organization.

**(4)** Bar code scanners, for example, exploit the directionality of a laser beam. The laser light reflects more strongly from white stripes than from black. Because of the directionality of the laser beam, the pattern of the bar code is mirrored faithfully in the reflected laser beam. These variations are "read" by a sensor, which converts the light pattern into an electronic representation of the bar code that the sensor transmits to a computer.

**(5)** The combination of high intensity and directionality is the basis for laser surgery. Essentially, a laser acts as a "light knife." In eye surgery, for example, a laser beam can be focused to a tiny spot at the back of the retina. This allows the surgeon to perform delicate operations such as repairing a detached retina without physically invading the eyeball.

Olmsted & Williams. 1997. *Lasers. Chemistry: The molecular Science*. (p 250) Iowa. Wm. C. Brown Publisher





## ACTIVITY

Answer the questions based on the text ***Lasers***.

### 1. Select the best option.

#### 1) The general topic of the text is:

- ☐ The laser beam was the most important discovery in 1960.
- ☐ The discovery of the laser beam and its relation to medicine.
- ☐ Characteristics, definition and applications of the laser beam.

#### 2) The Spanish equivalent of the acronym LASER (light amplification by stimulated emission of radiation) is:

- ☐ La amplificación de la luz a través de la emisión estimulada de la radiación.
- ☐ Amplificación de luz por la radiación estimulada de la emisión.
- ☐ La radiación de la emisión estimulada a través de la luz amplificada.

### 2. Identify and select the main idea of each paragraph. Choose the paragraph where each information can be found.

**A)** Introducing the origin of laser, a brief history and its main uses.

**B)** Contrasting the characteristics and properties of laser light and conventional light.

**C)** Describing the way a laser is generated and the meaning of its name.

**D)** Explaining how barcode scanners use a laser beam to read information.

**E)** Exemplifying the way surgeons take advantage of lasers' high intensity and directionality to operate eyes.

PARAGRAPH 1 \_\_\_\_

PARAGRAPH 2 \_\_\_\_

PARAGRAPH 3 \_\_\_\_

PARAGRAPH 4 \_\_\_\_

PARAGRAPH 5 \_\_\_\_



3. Reorder the steps of the process for making lasers by using the corresponding connectors.

FIRST,

☐ A) A sample of atoms or molecules is sucked out in energy.

EVENTUALLY,

☐ B) Light of specific wavelenght may interact with the atoms or molecules to produce more light of that wavelenght.

AFTER THAT,

☐ C) Mirrors are placed to reflect the light back into the sample.

THEN,

☐ D) The process can repeat itself many times, amplifying the intensity of the light by an immense quantity.

4. After reading each one of the following properties or characteristics, write if it is talking about **Laser Light** or **Conventional Light**. Write **Laser** or **Conventional** depending on the case.

A) It is monochromatic.

B) It produces light of many different colors.

C) It sends light in a precise direction.

D) It is multidirectional.

E) The light beam goes in an equal sequence.

F) It is disorganized.





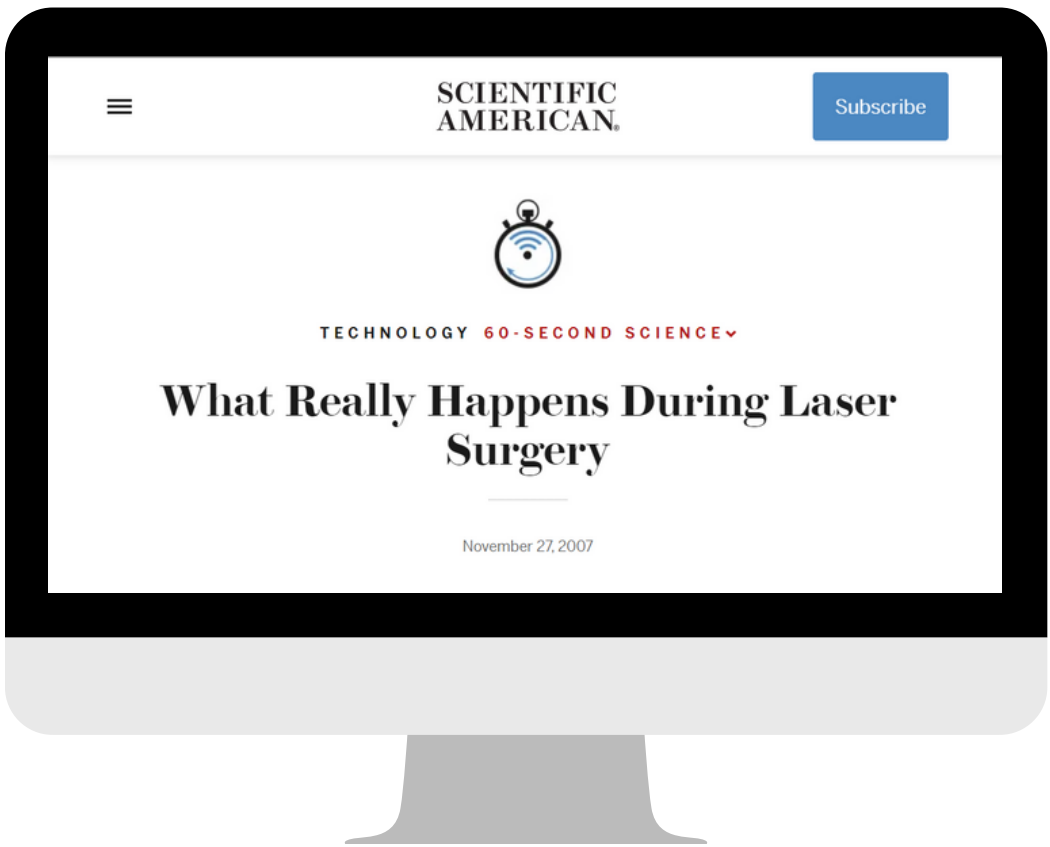
Closure



3. Listening Comprehension

You will listen to a short podcast and then you will be asked to answer a few questions.

WHAT REALLY HAPPENS DURING LASER SURGERY



Scan this QR code to listen to the podcast!



Chelsea Wald. (2007). What Really Happens During Laser Surgery [Podcast]. Retrieved from: <https://www.scientificamerican.com/podcast/episode/7A6C9388-E7F2-99DF-3C2E433725085BCB/>

1. Listen to the podcast carefully, and then choose **TRUE** or **FALSE** according to the statements.

- People worry about what happens to their flesh during a laser surgery.
- The living tissue works together with the laser beam to make the incision much more effective
- Scientists discovered that plasma forms more easily in living tissue than in water.
- Lasers in some surgeries are more powerful and damaging than thought.

|      |       |
|------|-------|
| TRUE | FALSE |
| TRUE | FALSE |
| TRUE | FALSE |
| TRUE | FALSE |



# ACTIVITY 7:

## SCIENTISTS STUDY HOLSTEIN MILK PRODUCTION

### Objectives

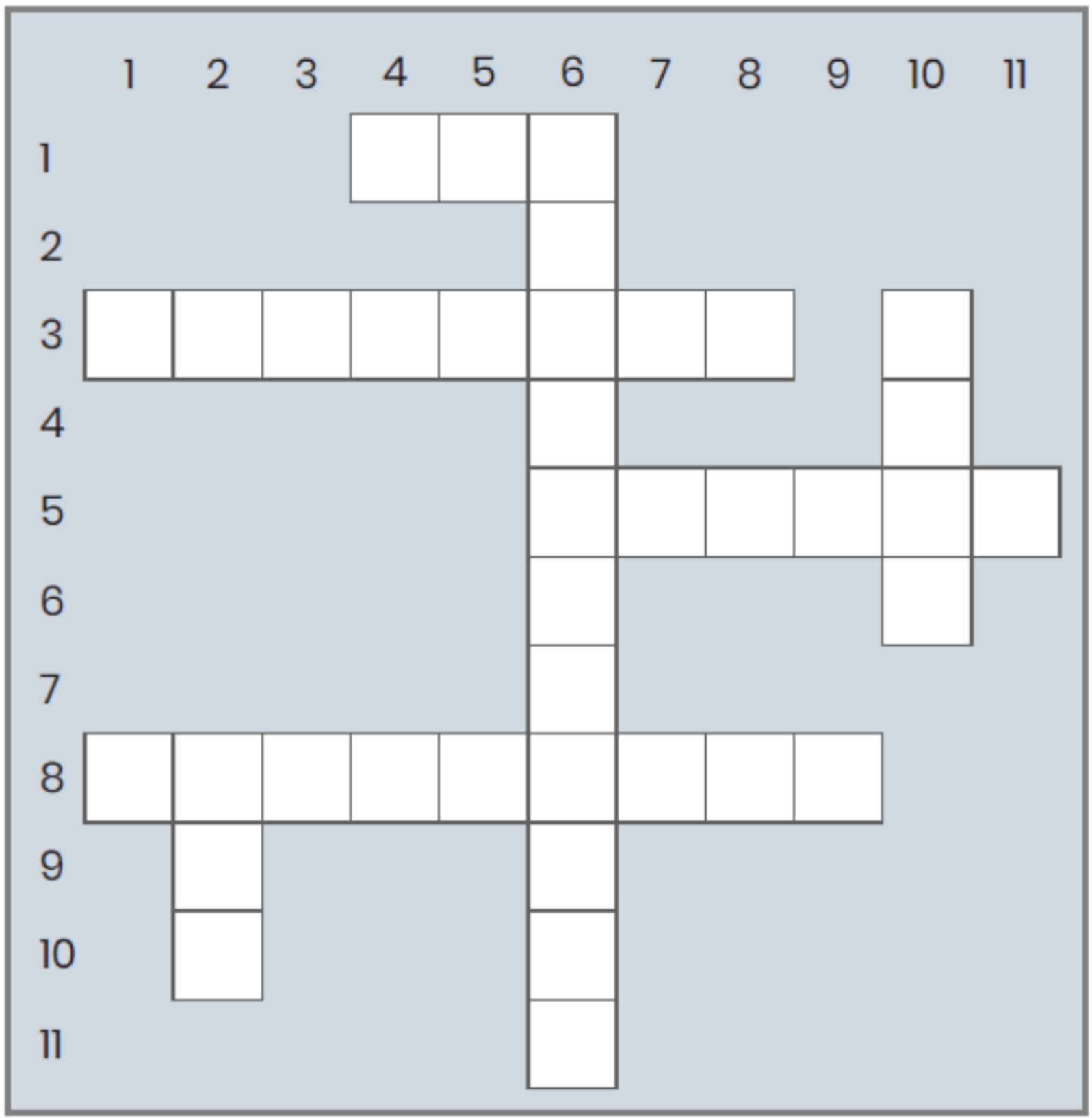
- To make predictions based on images.
- To identify acronyms and their meaning.
- To infer information from an audiovisual document.

### Preparation



#### 1. Activating Prior Knowledge

Do the crossword below.



#### ACROSS

- 1:** An acid in the chromosomes in the centre of the cells of living things. It determines the particular structure and functions of every cell and is responsible for characteristics being passed on from parents to their children.
- 3:** Work that involves studying something and trying to discover facts about it.
- 5:** Cows and bulls.  
**Clue:** \_ A T \_ \_ E
- 8:** Someone who has studied science and whose job is to teach or do research in science.

#### DOWN

- 2:** Large female animal that is kept on farms for its milk.
- 6:** Farming and the methods that are used to raise and look after crops and animals.
- 10:** The white liquid produced by cows, goats, and some other animals, which people drink and use to make butter, cheese, and yoghurt.



# Scientists Study Holstein Milk Production, Fertility



## Development



### 2. Reading Comprehension

- A)** Read and listen to the text *Scientists Study Holstein Milk Production, Fertility*.  
**B)** Based on the reading, do the next activity.

## Scientists Study Holstein Milk Production, Fertility



**(1)** Agricultural Research Service (ARS) scientists have discovered why Holsteins—bred to produce more milk—are less fertile than before breeding efforts were stepped up to increase dairy production: It's in their DNA.

**(2)** Since the U.S. dairy industry intensified selective breeding efforts in the 1960s, average milk yield in Holsteins has doubled, but the cattle are less fertile. A comparison of DNA from cattle selectively bred for milk production versus cattle isolated from such practices shows a genetic link between increased yields and reduced fertility, according to researchers at the ARS Animal and Natural Resources Institute (ANRI) in Beltsville, Md.



By Юкаман (Own work) [CC BY-SA 3.0 (<http://creativecommons.org/licenses/by-sa/3.0/>)], via Wikimedia Commons.

**(3)** The researchers teamed up with colleagues at the University of Minnesota (UM) to compare the genomes of modern Holsteins with those of UM cattle never exposed to the modern selective breeding practices. The lack of exposure meant that DNA from the UM cattle were genetic "time capsules" of an era before the selection efforts intensified.

**(4)** ANRI geneticist John Cole and colleagues drew DNA samples from the genetic material of about 2,000 cattle, stored at the ARS National Center for Genetic Resources Preservation, the Holstein Association USA, and five U.S. universities, including UM. The scientists extracted DNA and genotyped the samples using the Illumina Bovine SNP50 BeadChip, a glass slide capable of obtaining genotypes for thousands of markers simultaneously. The device was developed by ARS researchers in collaboration with industry, university and other ARS partners.

**(5)** By analyzing 50,000 genetic markers, the researchers found that many of the chromosomal regions associated with increased milk yield were also associated with reduced fertility rates. The results also showed that up to 30 percent of the Holstein genome may be influenced by standard breeding practices, according to Tad Sonstegard, an ANRI geneticist.

**(6)** The researchers say the results will help Holstein breeders and milk producers better understand tradeoffs between high yield and low fertility when selecting for more profitable dairy cattle.

USDA Agricultural Research Service. (2009, October 5). Scientists Study Holstein Milk Production, Fertility. PhysOrg.com. Retrieved from: <https://phys.org/news/2009-10-scientists-holstein-production-fertility.html>

# Scientists Study Holstein Milk Production, Fertility



## ACTIVITY

Answer the questions based on the text *Scientists Study Holstein Milk Production, Fertility*.

### 1. Match each definition with the concept it refers to.

1) A company that sells milk and sometimes makes other things from milk such as cheese.

2) The past tense and past participle of BREED: to keep animals or plants in order to produce babies or new plants.

3) The total or all the genes that are found in one type of living thing.

4) To produce.

5) Type of cow that is black and white.

6) Be able to produce babies, young animals or new plants.

7) A white liquid that people drink.

Bred

Fertility

Holstein

Milk

Genome

Yield

Dairy

### 2. Look for the following acronyms and write the full name they stand for.

1) ARS

.....

2) ANRI

.....

3) UM

.....

4) DNA

.....



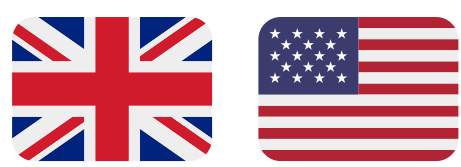
# Scientists Study Holstein Milk Production, Fertility



3. Fill in the table by adding the other forms of each family word. Follow the examples. Use a dictionary if necessary

| NOUN                     | VERB                    | ADJECTIVE                |
|--------------------------|-------------------------|--------------------------|
| EX: study                | EX: to study            | EX: studious             |
| fertility                | 1. <input type="text"/> | 2. <input type="text"/>  |
| 3. <input type="text"/>  | to preserve             | 4. <input type="text"/>  |
| 5. <input type="text"/>  | to research             | 6. <input type="text"/>  |
| collaboration            | 7. <input type="text"/> | 8. <input type="text"/>  |
| producers                | 9. <input type="text"/> | 10. <input type="text"/> |
| 11. <input type="text"/> | X                       | agricultural             |

4. Match each statement with its Spanish translation. Write 1, 2, 3, or 4.



- 1) A genetic link between higher milk yields and less fertility has been found in Holstein cattle.
- 2) The device was developed by ARS researchers...
- 3) ... the chromosomal regions associated with increased milk yield were also associated with reduced fertility rates.
- 4) ... the Holstein genome may be influenced by standard breeding practices.



- ☐ A) ... las regiones del cromosoma asociadas con el aumento en la producción de leche estuvieron relacionadas también con bajas tasas de fertilidad.
- ☐ B) Se ha encontrado en el ganado Holstein un vínculo genético entre mayor producción de leche and menor fertilidad.
- ☐ C) ... el genoma encontrado en la raza Holstein puede estar influenciado por prácticas de crianza estandarizadas.
- ☐ D) El mecanismo fue desarrollado por investigadores de ARS.

# Scientists Study Holstein Milk Production, Fertility



## Closure



### 3. Listening Comprehension

Watch the video **Fairy Oaks Farm Adventures Center** as many times as you need it. Then, answer the questions.

#### OAKS FARMS IN THE U.S.



Scan this QR code to watch the video!



America's Heartland. (2009). Fair Oaks Farms Adventure Center - America's Heartland [Video]. Retrieved from: <https://www.youtube.com/watch?v=JJRy82i8e5Q>

1) How many times a day do they milk Holsteins?

.....

2) Where do cows stop to be milked?

.....

3) What and how much does each cow consume?

.....

4) What happens to the manure the cows generate?

.....





# Engineering Ethics

## ACTIVITY 8: ENGINEERING ETHICS

### Objectives

- To activate background knowledge about engineering ethics to get familiar with the topic.
- To recognize the function of some connectors and modal verbs.
- To reach a detailed understanding of the text by answering specific questions.

### Preparation



#### 1. Activating Prior Knowledge

Answer the following question.

#### ABOUT ETHICS

Can you give some examples of constructions or devices that have been wrongly made or are harmful to man? Give some possible reasons for your answer. Then, discuss your answer with your classmates.



# Engineering Ethics

## Development



### 2. Reading Comprehension

- A) Read and listen to the text *Engineering Ethics*.  
B) Based on the reading, do the next activity.

## Engineering Ethics



(1) Ethics is the study of the morality of human actions. It is the science of determining values in human conduct and of deciding what ought to be done in different circumstances and situations. Engineering ethics represents the attempts of professional engineers to define proper courses of action in their dealings with each other, with their clients and employees, and with the general public.

(2) The problem of engineering ethics, as well as those of other professions, begins with the fact that the professional possesses specialized knowledge that is superior to that possessed by clients, employers, or the general public. With this knowledge, a responsible and honest engineer can be a very useful member of society. An irresponsible or corrupt engineer can weaken the confidence of the public in the engineering profession and even become a dangerous, member of society

(3) As in other professions, engineers have attempted to establish rules or standards of conduct in the form of codes of ethics. These codes not only protect the public, but also build and preserve the integrity and reputation of the profession. There is no single code of ethics for all engineering societies. However, there is considerable agreement among engineers as to what constitutes ethical behavior, and there is a great deal of similarity among the various ethical codes. The Code of Ethics published by Accreditation Board for Engineering and Technology is shown in **Figure 3.4**. The code consists of four fundamental principles and seven fundamental canons or authoritative rules. These principles and canons comprise basic rules of professional behavior suitable for all engineering specialties. Since ethical decisions are sometimes difficult and equivocal, more detailed guidelines for use with the Fundamental Canons of Ethics have been prepared by several engineering organizations.

### CODE OF ETHICS OF ENGINEERS (published by Accreditation Board for Engineering and Technology)

#### THE FUNDAMENTAL PRINCIPLES

Engineers uphold and advance the integrity, honor and dignity of the engineering profession by:

- I. using their knowledge and skill for the enhancement of human welfare;
- II. being honest and impartial, and serving with fidelity the public, their employers and clients;
- III. striving to increase the competence and prestige of the engineering profession; and
- IV. supporting the professional and technical societies of their disciplines.

#### THE FUNDAMENTAL CANONS

1. Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.
2. Engineers shall perform services only in the areas of their competence.
3. Engineers shall issue public statements only in an objective and truthful manner.
4. Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest.
5. Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.
6. Engineers shall act in such a manner as to uphold and enhance the honor, integrity and dignity of the profession.
7. Engineers shall continue their professional development throughout their careers and shall provide opportunities for the professional development of those engineers under their supervision.

**Figure 3.4.** Code of Ethics of Engineers. (Courtesy of the Accreditation Board for Engineering and Technology)

Wright, Paul H. 1998. *Engineering Ethics. Introduction to Engineering.* (pp 56, 57) New York. John Wiley & Sons.





# Engineering Ethics

## ACTIVITY

Answer the questions based on the text *Engineering Ethics*.

1. Read and listen to the whole text. Then, give the definitions to:

ETHICS

.....

.....

.....

ENGINEERING ETHICS

.....

.....

.....

2. Answer the following questions taking into account the text and your own experiences. Discuss your answers with your peers and professor.

1) How do engineers maintain and move ahead of the integrity, honor, and dignity of their profession?

.....

.....

.....

2) Now, carefully read the seven fundamental canons. What are the three most important for you? Explain your selection.

.....

.....

.....

3. According to the text, select the best option in order to complete the statements.

1) A problem of engineering ethics is due to...

- ☐ the lack of engineer's expertise
- ☐ the way engineers use their specialized knowledge.
- ☐ the lack of knowledge by the general public, clients and employers.

2) An honest engineer could be

- ☐ a helpful person in society.
- ☐ a useless person in society
- ☐ both, a worthless and a serviceable person in society.

3) Codes of engineering ethics have been established

- ☐ for the engineer's convenience.
- ☐ in order to protect the public and preserve the integrity and name of the profession.
- ☐ for protecting and preserving public goods.

4) There is not a unique code of engineering ethics,

- ☐ but there is a considerable agreement among engineers as to what constitutes ethical behavior.
- ☐ although there is a considerable agreement among engineers as to what constitutes ethical behavior.
- ☐ somehow there is considerable agreement among engineers as to what constitutes ethical behavior.

5) More detailed guidelines to use along with the fundamental principles and canons of ethics have been established.

- ☐ e.g. some ethical decisions are difficult and uncertain.
- ☐ i.e. some ethical resolutions are easy and evident.
- ☐ because some ethical resolutions are difficult and uncertain.



# Engineering Ethics

4. Research the use of the **Modal Auxiliary Verbs** and then decide if the underlined modals in the phrases presented in the exercise can replace the modality of **SHALL** in some instances. Choose **YES** if is possible or **NO** if is not possible.

- |                                                                                                                             |                |               |
|-----------------------------------------------------------------------------------------------------------------------------|----------------|---------------|
| 1. Engineers <u>could</u> perform services only in the areas of their competence.                                           | <div>YES</div> | <div>NO</div> |
| 2. Engineers <u>will</u> issue public statements only in an objective and truthful manner.                                  | <div>YES</div> | <div>NO</div> |
| 3. Engineers <u>must</u> act in professional matters for each employer or client as faithful agents and trustees.           | <div>YES</div> | <div>NO</div> |
| 4. Engineers <u>should</u> build their professional reputation on the merit of their services.                              | <div>YES</div> | <div>NO</div> |
| 5. Engineers <u>might</u> act in such a manner as to uphold and enhance the honor, integrity and dignity of the profession. | <div>YES</div> | <div>NO</div> |

5. Select the purpose that better fits the given verbs.

- |                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) Engineers <u>could</u> perform services only in the areas of their competence.<br><input type="radio"/> Absolute obligation<br><input type="radio"/> Possibility<br><input type="radio"/> Promise                                    | 4) Engineers <u>should</u> build their professional reputation on the merit of their services.<br><input type="radio"/> Suggestion<br><input type="radio"/> Necessity<br><input type="radio"/> Duty                                       |
| 2) Engineers <u>might</u> issue public statements only in an objective and truthful manner.<br><input type="radio"/> Moral rightness<br><input type="radio"/> Suggestion<br><input type="radio"/> Probability                           | 5) Engineers <u>might</u> act in such a manner as to uphold and enhance the honor, integrity and dignity of the profession.<br><input type="radio"/> Synonym of must<br><input type="radio"/> Option<br><input type="radio"/> Possibility |
| 3) Engineers <u>must</u> act in professional matters for each employer or client as faithful agents and trustees.<br><input type="radio"/> Absolute obligation<br><input type="radio"/> Requirement<br><input type="radio"/> Suggestion |                                                                                                                                                                                                                                           |

6. Translate the following nominal phrases into Spanish.

e.g. Engineering Ethics: La ética de la ingeniería.

- |                                                        |       |
|--------------------------------------------------------|-------|
| A) A responsible and honest engineer.                  | ..... |
| B) An irresponsible or corrupt engineer.               | ..... |
| C) Ethical behavior.                                   | ..... |
| D) The various ethical codes.                          | ..... |
| E) Accreditation Board for Engineering and Technology. | ..... |





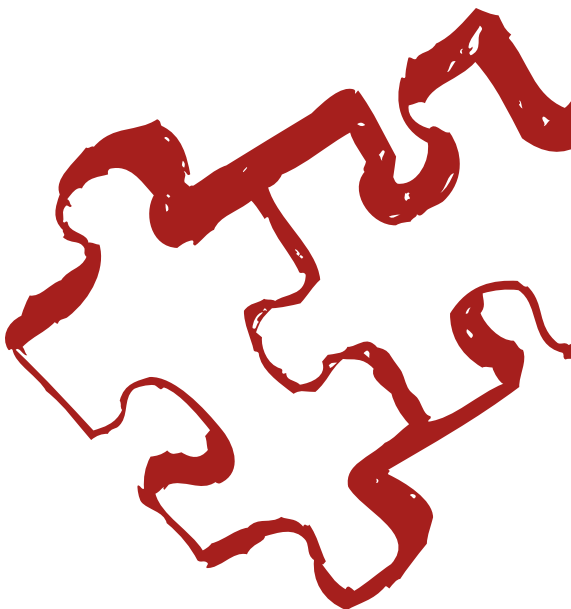


## Closure



### 3. Memory Game

Match each adjective with its corresponding **antonym**.



EASY

ETHICAL

DECEITFUL

DISHONEST

RESPONSIBLE

OBJECTIVE

USELESS

IMPROPER

SAFE

TRUTHFUL

UNETHICAL

DIFFICULT

HONEST

SUITABLE

DISLOYAL

SUBJECTIVE

FAITHFUL

USEFUL

IRRESPONSIBLE

DANGEROUS





- 

A large rectangular box with rounded corners, containing ten horizontal dotted lines for writing.





## Development



### 2. Reading Comprehension

- A) Read and listen to the text *Contributions of the Greeks*.  
B) Based on the reading, do the next activity.

## Contributions of the Greeks



(1) Beginning about 600 B.C., the Greek way of life and thought became dominant in the eastern Mediterranean area. The Greeks are best remembered for their abstract logic and their ability to theorize and to synthesize the knowledge of the past. Their advances in art, literature, and philosophy were great, tending to overshadow their contributions to engineering. **They** tended to focus mainly on theory and placed little value on experimentation and verification and on practical application. In fact, the great Greek thinkers expressed the viewpoint that any application of the fruits of the mind to material needs was not worthy of dignity or respect.



(2) Nevertheless, the Greek architecton made the first notable advance toward professional stature. **He** was recognized as a master builder and construction expert with knowledge and experience beyond the scope of the average citizen.

(3) The Greek peninsula was so cut up by mountain ranges that land communication was difficult. The Greeks turned to the sea to become **the first great harbor builders**. Herodotus described a great breakwater or mole that was constructed to protect the harbor at Samos. The breakwater was 400 yards long and was built in water 120 feet deep. **This** represents the first recorded construction of an artificial harbor, and it was to become a prototype in harbor planning even into modern times.

(4) The Greeks' interest in navigation later led to the building of the first lighthouse in the world, the Pharos at the port of Alexandria. **This 370-foot-high structure**, built about 300 B.C., was known as **one of the Seven Wonders of the Ancient World**.

(5) Another great work built on the island of Samos was **a 3300-foot-long tunnel cut through a 900-foot hill** under the direction of the architecton Eupalinus of Megara. The main tunnel, **which** was **hand-chiseled through solid lime-stone**, was about 5.5 feet in width and height. At the bottom of the main tunnel, a trench was cut 30 feet deep and 3 feet wide. In this trench, water was brought through clay pipes to the city. The tunnel construction was carried out from both ends, but the surveying methods used to perform **this work** are not known.

(6) During the Golden Age of Greece, the ruler Pericles undertook **a huge building program** designed to make Athens the most beautiful city on earth.

**He** retained the services of leading artists and building experts of the time to build temples, shrines, and statues on the Acropolis, the flat topped rock overlooking the city. The ruins of these works today provide **one of the world's most remarkable sights**.

(7) The builders of the Greek temples must have used timber frames and manual hoists that were equipped with capstans and pulleys similar to **those** used in modern times. By their use of columns and beams, the designers showed a level of structural understanding not demonstrated by builders of the past.

Source: Wright, Paul H. 1998. *Contributions of the Greeks. Introduction to Engineering*. (pp 5,6) New York. John Wiley & Sons.

# Contributions of the Greeks



## ACTIVITY

Answer the questions based on the text *Contributions of the Greeks*.

1. Propose a new title for the reading.

2. Decide whether the following statements are true or false. Write **TRUE** or **FALSE** in the blanks.

- 1) Ancient Greeks were considered as master builders and able to theorize and synthesize.
- 2) The Greeks' longest construction was a tunnel.
- 3) The Greeks were one of the best civil engineers of their age.
- 4) Athens was designed and constructed only by Pericles.
- 5) Ancient Greeks were great navigators.
- 6) Eupalinus of Megara directed a great work on an ocean.
- 7) The surveying methods used to make the tunnel were unknown.
- 8) Earth communication was very easy in the Greek peninsula.
- 9) Herodotus was a great Greek architect.
- 10) According to the text, a breakwater is a barrier that breaks the force of the waves.

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE

TRUE

FALSE

3. Analyze the words in the table and classify them as **derived** or **compound words**, answer according as the examples given.

| WORD         | DERIVED/COMPOUND | SPANISH VERSION |
|--------------|------------------|-----------------|
| Eastern      | Derived          | Oriental        |
| Knowledge    | 1. <div></div>   | Conocimiento    |
| Engineering  | 2. <div></div>   | Ingeniería      |
| Viewpoint    | Derived          | Punto de vista  |
| Professional | 3. <div></div>   | Profesional     |
| Breakwater   | 4. <div></div>   | Rompeolas       |
| Building     | 5. <div></div>   | Edificio        |
| Lighthouse   | 6. <div></div>   | Faro            |
| Surveying    | 7. <div></div>   | Topográfico     |



# Contributions of the Greeks



4. Match the referent given with the referenced word. The number refers to the paragraph the referent can be found.



A) He (2)

B) They (1)

C) This (3)

D) Which (5)

E) He (6)

F) This work (5)

G) Those (7)

- ..... The Greeks
- ..... The tunnel construction
- ..... The ruler Pericles
- ..... The breakwater
- ..... The Greek architecton
- ..... The main tunnel
- ..... Capstans and Pulleys

5. Fill in the blanks beside each noun with the corresponding verb form or each verb with its corresponding noun form. One and two have been done for you as examples.

1) Theorize VERB Theory NOUN

2) Contributions NOUN Contribute VERB

3) Experimentations NOUN ..... VERB

4) Verify VERB ..... NOUN

5) Application NOUN ..... VERB

6) Thinker NOUN ..... VERB

7) Build VERB ..... NOUN

8) Construction NOUN ..... VERB

9) Communicate VERB ..... NOUN

10) Protection NOUN ..... VERB

11) Planning NOUN ..... VERB

12) Navigation NOUN ..... VERB

13) Understand VERB ..... NOUN

6. Write the Spanish version for these nominal phrases below. The number refers to the paragraph in which each phrase can be found.

Ex. A huge building program (6) - un enorme programa de construcción

- a) The first great harbor builders (3)
- b) This 370-foot-high structure (4)
- c) One of the Seven Wonders of the Ancient World (4)
- d) A 3300-foot-long tunnel cut through a 900-foot hill (5)
- e) Hand-chiseled through solid limestone (5)
- f) One of the world’s most remarkable sights (6)

.....

.....

.....

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## Closure

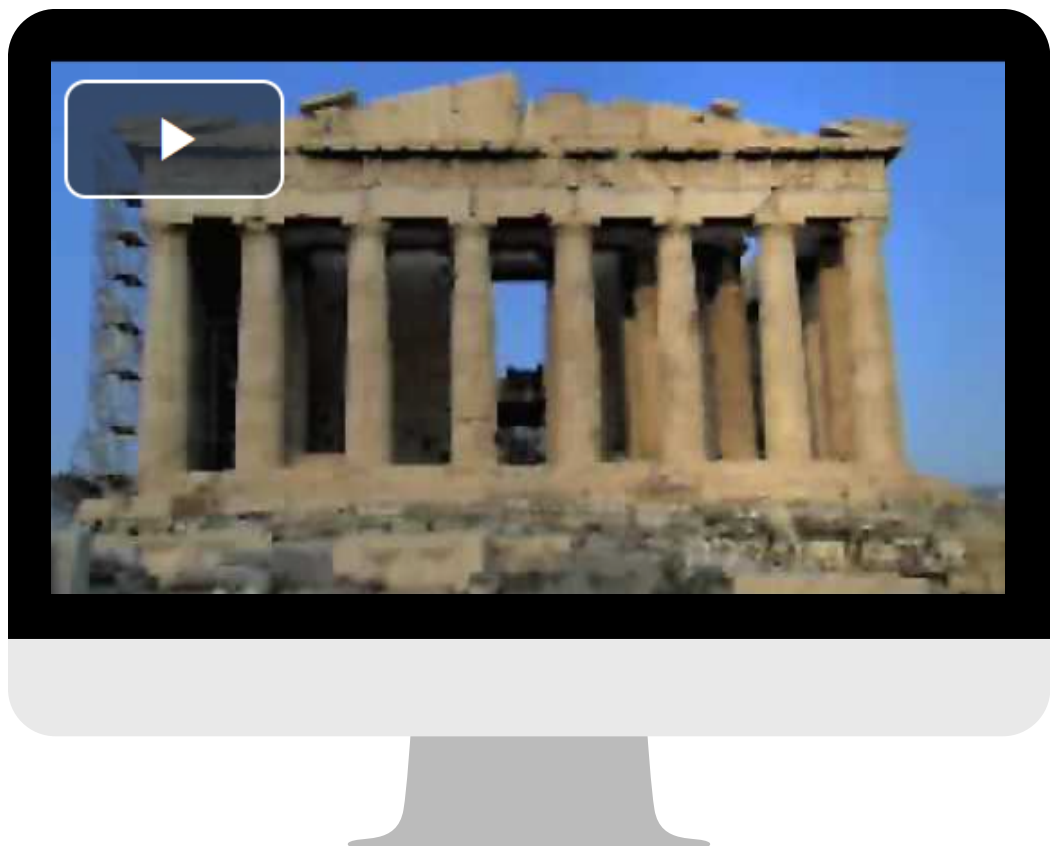


### 3. Listening Comprehension

You will watch a short video about the Parthenon, then you will answer the question below.

#### THE PARTHENON

Wach the following video *Optical Tricks of the Parthenon*.

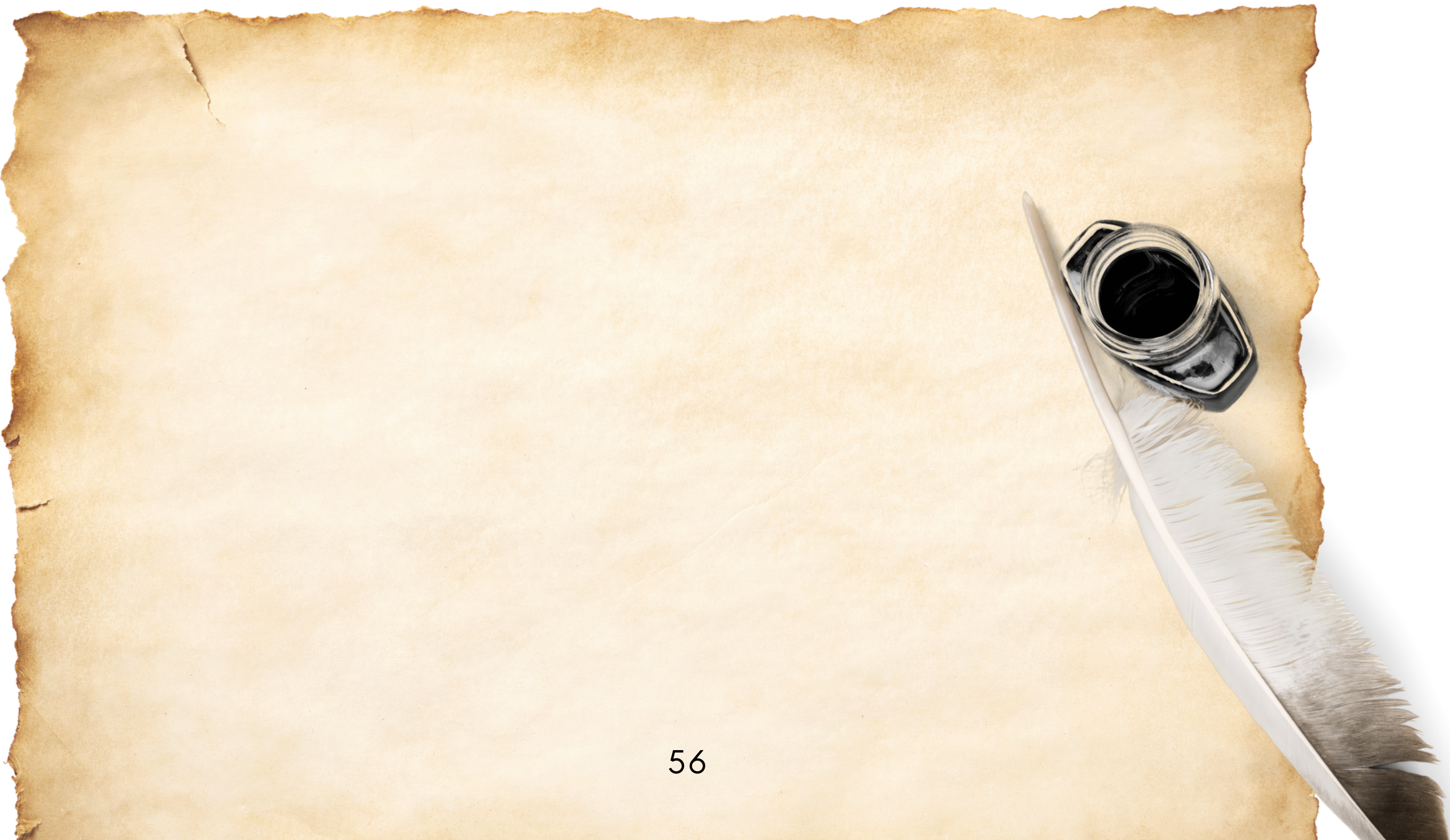


Scan this QR code to watch the video!



NOVA PBS Official. (2008, January 24). Optical Tricks of the Parthenon. Retrieved from: <https://www.youtube.com/watch?v=7AIXvZRsiq4&t=20s>

1) Now, write down the **new information** that you could find in the previous video.







## ACTIVITY 10: CIVIL ENGINEERING

### Objectives

- To skim through a text, and find main ideas, concepts and definitions.
- To recognize word formation and derivation.
- To infer information from an audiovisual document.

### Preparation



#### 1. Activating Prior Knowledge

Answer the following question.

#### CIVIL ENGINEERING

##### 1) What famous building around the world do you know?



##### 2) Civil and environmental engineers are concerned about...

- ☐ Access to clean drinking water and environmental remediation.
- ☐ Public infrastructure renewal and sustainable solutions to energy needs.
- ☐ All of the above.

##### 3) A civil engineer...

- ☐ looks at all the available materials which make up the Earth's crust, studying the ways in which they are formed and altered.
- ☐ is responsible for designing, building and maintaining all public infrastructures necessary for a growing population.
- ☐ is involved in the research and development of new products that involve the interaction of chemical compounds with a number of different types of materials.





## Development



### 2. Reading Comprehension

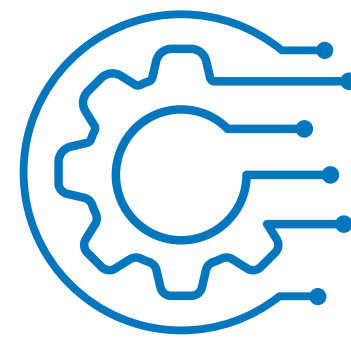
- A) Read and listen to the text *Civil Engineering*.  
B) Based on the reading, do the next activity.

## Civil Engineering



Civil is a very broad branch of engineering, and it includes at least seven major specialized areas of practice:

- 1) Structural engineering.
- 2) Construction engineering and management.
- 3) Transportation engineering.
- 4) Geotechnical engineering.
- 5) Hydraulic and water resources engineering.
- 6) Environmental engineering.
- 7) Geodetic engineering.



The largest specialty within Civil Engineering, structural engineering is concerned with the design of large buildings, bridges, tanks, towers, dams, and other large structures. These engineers design and select appropriate structural components (e.g., beams, columns, and slabs) and systems to provide adequate strength, stability, and durability.

*A large fraction of civil engineers work in the construction industry, building the facilities that other engineers and architects design. The task of construction engineers is to utilize and manage the resources of construction (the vehicles, equipment, machines, materials, and skilled workers) to produce with timeliness and efficiency the structure or facility envisioned by the designer.*

Transportation engineers are concerned with the planning and layout of highways, airports, harbors and ports, and mass transportation systems. They plan and design transportation terminals and devise and operate systems for the control of vehicular traffic.

Geotechnical engineers are concerned with the structural behavior of soil and rock. They analyze earth support systems and design foundations, earth walls, and highway, and airport pavements.

Hydraulic and water resources engineers are concerned with the flow of water through ditches, conduits, canals, dams, and estuaries. They use their special knowledge of fluid mechanics to design dam, irrigation systems, municipal water works, and drainage and erosion control systems.

Environmental engineers are concerned with solid waste management, air and water pollution, and control of pesticides and radiological hazards. They design and oversee the operation of water treatment and sewage treatment plants and measure and monitor pollutants in the air, on land, and in lakes and streams.

Geodetic engineers measure and map the earth's surface. They locate precisely property and building lines and survey the locations, elevations, and alignment of engineering projects.

Civil engineers work with construction companies, manufacturing companies, power companies, and with consulting engineering firms. Many opportunities for civil engineering employment exist in city, county, and state engineering departments and in the various agencies of the federal government.

Source: Wright, Paul H.(1998). *Civil Engineering. Introduction to Engineering.* (pp 30). New York. John Wiley & Sons.





# Civil Engineering



## ACTIVITY

Answer the questions based on the text **Civil Engineering**.

1. Look at the whole text which is divided into three main parts. Write in the box what they refer to:

Part 1 (Paragraph 1):

Part 2 (Paragraphs 2, 3, 4, & 5):

Part 3 (Paragraph 6):

2. Match each statement with the different engineer scopes.

|                                       |                                                                                                                                                                              |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Transportation Engineers              | <input type="radio"/> A) Design and supervise the water treatment operation and sewage treatment plants.                                                                     |
| Structural Engineer                   | <input type="radio"/> B) Utilize and manage resources of construction.                                                                                                       |
| Hydraulic & Water Resources Engineers | <input type="radio"/> C) Analyze earth support systems and design foundations.                                                                                               |
| Environmental Engineers               | <input type="radio"/> D) Use their special knowledge of fluid mechanics to design dams, irrigation systems, municipal water works, and drainage and erosion control systems. |
| Geotechnical Engineers                | <input type="radio"/> E) Locate precisely property and building lines and survey the locations, elevations, and alignments of engineering projects.                          |
| Construction Engineers & Management   | <input type="radio"/> F) Plan and layout systems for moving people.                                                                                                          |
| Geodetic Engineers                    | <input type="radio"/> G) Design and select appropriate structural components.                                                                                                |

3. Decide whether the following statements are **TRUE** or **FALSE**.

- 1) Structural engineers specialize in the design of buildings, including residential housing.

TRUE

FALSE
- 2) Civil engineers can be contracted through the architect or builder of a construction.

TRUE

FALSE
- 3) Geodetic engineers must consider factors such as wind speed, snow loads, and occupancy loads along with the plans detailed in the architectural drawings.

TRUE

FALSE
- 4) Civil engineering can also be considered as the branch of engineering which focuses on the design, construction, and maintenance of public works.

TRUE

FALSE
- 5) Transport engineering is the science of safe and efficient movement of people and transport.

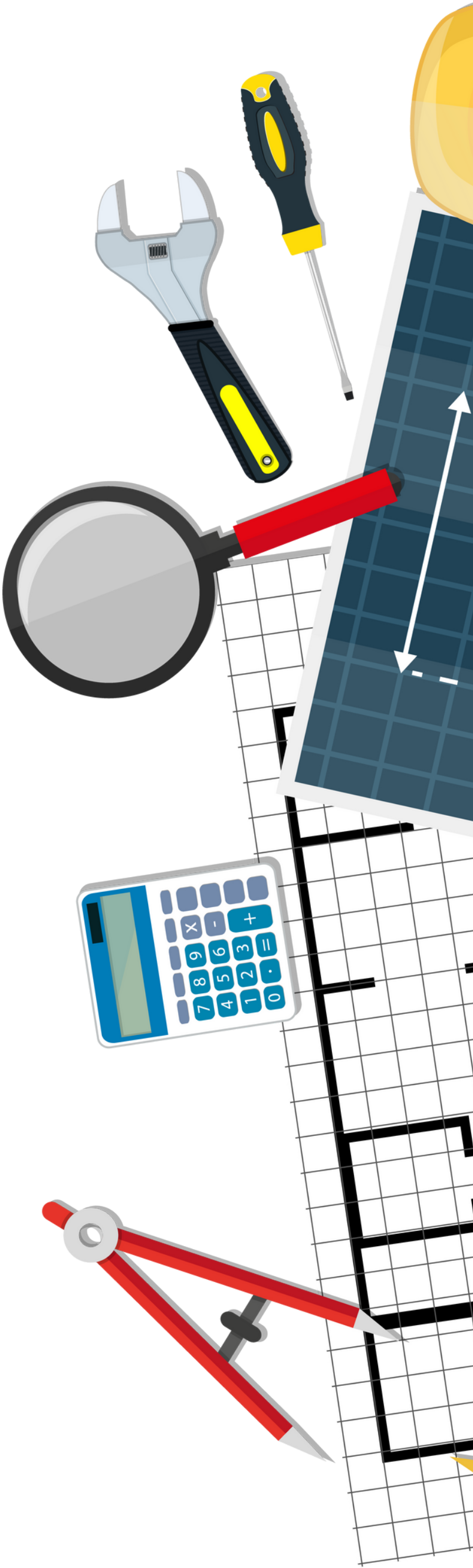
TRUE

FALSE
- 59



4. Write the corresponding noun or verb in the blanks. Use a dictionary if necessary. Two examples have been done for you.

| VERBS            | NOUNS        |
|------------------|--------------|
| 1) To strengthen | Strength     |
| 2) To construct  | Construction |
| 3) To work       |              |
| 4) To design     |              |
| 5) To pave       |              |
| 6) To            | Production   |
| 7) To            | Operation    |
| 8) To            | Irrigation   |
| 9) To erode      |              |
| 10) To           | Management   |
| 11) To pollute   |              |
| 12) To treat     |              |
| 13) To           | Measurement  |
| 14) To locate    |              |
| 15) To           | Elevation    |
| 16) To align     |              |
| 17) To employ    |              |
| 18) To govern    |              |







# Civil Engineering



5. There are words which have similar form in Spanish but different meaning in English (**false cognates**). Taking into account the context, complete the following table by writing the apparent meaning and the real meaning in Spanish of some words taken from the text. One example has been done for you.

| False Cognates     | Apparent Meaning in Spanish | Real Meaning in Spanish |
|--------------------|-----------------------------|-------------------------|
| Large (P. 3)       | Largo                       | Grande                  |
| Facility (P. 4)    | 1. <input type="text"/>     | 2. <input type="text"/> |
| Devise (P. 5)      | 3. <input type="text"/>     | 4. <input type="text"/> |
| Design (P. 6)      | 5. <input type="text"/>     | 6. <input type="text"/> |
| Foundations (P. 6) | 7. <input type="text"/>     | 8. <input type="text"/> |

6. Match each root with each corresponding suffix.

|         |                      |        |                      |        |                      |
|---------|----------------------|--------|----------------------|--------|----------------------|
| Engine  | <input type="text"/> | Streng | <input type="text"/> | Design | <input type="text"/> |
| Manage  | <input type="text"/> | Dur    | <input type="text"/> | Know   | <input type="text"/> |
| Environ | <input type="text"/> | Work   | <input type="text"/> | Drain  | <input type="text"/> |
| Large   | <input type="text"/> | Time   | <input type="text"/> | Treat  | <input type="text"/> |

-li-ness

-ment-al

-ment

-ledge

-age

-able

-er

-th

-er-ing

-less-ness

-est

-abil-ity









# Plastics



## ACTIVITY 11: PLASTICS

### Preparation



#### 1. Activating Prior Knowledge

Answer the following question.

#### PLASTICS

Plastic is an organic compound produced from man-made polymers which can be molded in various forms.

Adapted from [www.yourdictionary.com](https://www.yourdictionary.com)



All photos were taken from <https://pixabay.com/es/>

Below you find several definitions of products made of plastic. Based on your previous knowledge, match the left side to the right side.

- 1) A small, shallow, usually oval-shaped bowl and a handle, used for picking up or stirring food.

2) A thick, heavy fabric of wool, cotton, or synthetic fibers for covering a floor, stairs.

3) A plate-shaped disk sailed back and forth between players in a simple game.

4) A hand-held instrument of bristles and a handle, used for painting, cleaning, grooming.

5) A container with a neck that holds liquids.

6) A deep, round container with a flat bottom and a curved handle, used to hold or carry water.

7) An object, often a small representation of something familiar, as an animal or person, for children or others to play with.

8) A container that can store items or be used to carry items.

9) A small disk used for fastening two parts of a clothing.

10) A device used to make or break a connection in a circuit.
- ☐

☐

☐

☐

☐

☐

☐

☐

☐

☐





# Plastics



## Development



### 2. Reading Comprehension

- A) Read and listen to the text *Plastics*.  
B) Based on the reading, do the next activity.

## Plastics

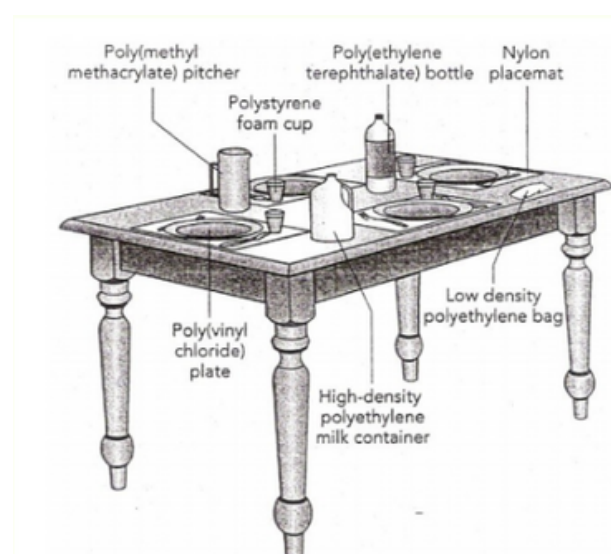


(1) Until the middle of the nineteenth century, virtually all objects of everyday life were made from naturally occurring or naturally derived materials such as wood, glass, metal, paper, wool, and rubber. While this short list of available materials was sufficient for most purposes, there were situations that demanded something new. In 1863, a billiard ball manufacturing company, Phelan and Collander, offered a prize of \$10,000 to anyone who could find a substitute for natural ivory in billiard balls. In response to this offer, American printer John W. Hyatt and his brother Isaiah figured out how to form billiard balls out of a recently discovered synthetic chemical called nitrocellulose. By 1871, Hyatt had established two companies to work with this new material under the name celluloid, and the plastics industry was born.

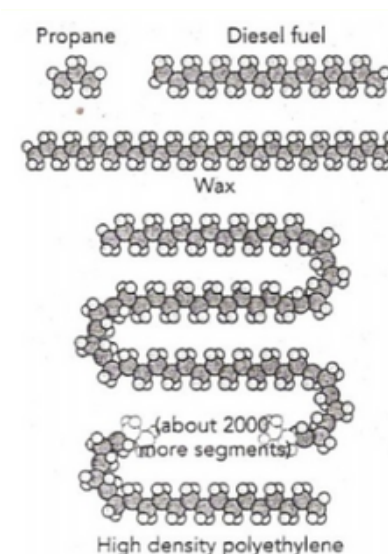
(2) The word plastic has a wide usage and a broad definition. Most often it refers to materials that, while solid in their final forms, take on liquid or shapeable states during earlier phases. Modern plastics can assume many shapes and forms and exhibit a rich variety of physical and chemical properties. Most importantly, the development of plastics has made it possible to design materials that exactly suit their uses.

## Polymers

(3) Plastics are based on polymers, enormous chain-like molecules containing thousands or even millions of atoms. Like all organic molecules, and the glasses of the previous section, the atoms in a polymer are held together by covalent bonds. But while propane, diesel fuel, and paraffin wax consist of chain-like molecules roughly 3, 16, and 30 carbon atoms long, respectively, the chain-like molecules of high-density polyethylene (HDPE) are between 1000 and 3000 carbon atoms long (Fig. 17.3.1). Once a molecule is more than about 1000 atoms long, it's considered a polymer. (For a history of the understanding of polymers, see image 1).



**Image 1.** Polymers were discovered long before anyone understood what they were. It wasn't until 1920 that the German chemist Hermann Staudinger (1881-1965) made his macromolecular hypothesis, suggesting that polymers are actually giant molecules formed by the permanent attachment of countless smaller molecules. Through careful experiments, he proved his hypothesis to be correct and was awarded the 1953 Nobel Prize in Chemistry.



**Fig. 17.3.1** Paraffin chains are found in many materials. Each paraffin chain consists of a backbone of carbon atoms (the larger balls), decorated by pairs of hydrogen atoms (the smaller balls). A chain is terminated at each end by an extra hydrogen atom. Propane, diesel fuel, and wax contain relatively short paraffin chains while high-density polyethylene, the plastic used in milk containers, contains paraffin chains of between 1000 and 3000 carbon atoms.

Boomfield, Louis A. (2007). *Plastics. How Everything Works.* (pp. 587) New York. John Wiley & Sons.





# Plastics



## ACTIVITY

Answer the questions based on the text *Plastics*.

1. What is the purpose of the author in:

Paragraph ...

A) Definition and characteristics of plastic.

B) Beginning of the plastic manufacturing industry.

Paragraph ...

Paragraph ...

C) Molecular structure of plastic and its connection to polymers.

2. Organize the following phrases to complete the definition.

1

2

3

4

that can be shaped when soft

into many different forms

an artificial substance

Plastic is

3. Read the two texts below and **identify the false cognates**. Fill in the blanks the false cognate which accurate definition is given in column B.

| TEXT 1                                                                                                                                                                                                                                                                                                                                                                                                                                                          | TEXT 2                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Paraffin chains are found in many materials. Each paraffin chain consists of a backbone of carbon atoms (the larger balls), decorated by pairs of hydrogen atoms (the smaller balls). A chain is terminated at each end by an extra hydrogen atom. Propane, diesel fuel, and wax contain relatively short paraffin chains while high-density polyethylene, the plastic used in milk containers, contains paraffin chains of between 1000 and 3000 carbon atoms. | Polymers were discovered long before anyone understood what they were. It wasn't until 1920 that the German chemist Hermann Staudinger (1881-1965) made his macromolecular hypothesis, suggesting that polymer is actually giant molecules formed by the permanent attachment of countless smaller molecules. Through careful experiments, he proved his hypothesis to be correct and was awarded the 1953 Nobel Prize in Chemistry. |
| COLUM A                                                                                                                                                                                                                                                                                                                                                                                                                                                         | COLUM B                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <div></div> <div></div> <div></div>                                                                                                                                                                                                                                                                                                                                                                                                                             | <div>From Germany</div> <div>Actual or an existing fact.</div> <div>A single time.</div>                                                                                                                                                                                                                                                                                                                                             |

Both texts were taken from the figure's descriptions in the reading.  
Boomfield, A. (2007). *Plastics*. In: *How Everything Works*. (pp. 587) New York: John Wiley & Sons.



# Plastics



4. Write the **nucleus** of the following noun phrases. The first one has been done for you.

*Naturally occurring and naturally derived materials.*

materials

1) A billiard ball manufacturing company

.....

2) A rich variety of physical and chemical properties

.....

.....

3) The chain-like molecules of high-density polyethylene.

.....

.....

5. Match each year with its respective event according to the information given in the text.

Middle 19th Century

1863

1871

1920

1953

1) The German chemist Hermann Staudinger made his macromolecular hypothesis.

2) Hermann Staudinger won the Nobel Prize in Chemistry.

3) All objects were made from materials naturally occurring or derived materials.

4) Phelan and Collander offered a prize to motivate finding a substitute for natural ivory.

5) Hyatt had established two companies to work with celluloid and the plastic industry was born.

6. Analyze the following derived words.

| Paragraph 1                    | Paragraph 2                        | Paragraph 3           |
|--------------------------------|------------------------------------|-----------------------|
| <b>Virtually:</b> virtual + ly | <b>Shapeable:</b>                  | <b>Understanding:</b> |
|                                | 1. + 2.                            | 3. + 4.               |
| <b>Available:</b>              | <b>Chemical:</b>                   |                       |
| 5. + 6.                        | 7. + 8.                            |                       |
| <b>American:</b>               | <b>Development:</b> develop + ment |                       |
| 9. + 10.                       |                                    |                       |
| <b>Printer:</b>                | <b>Exactly:</b>                    |                       |
| 11. + 12.                      | 13. + 14.                          |                       |

7. Analyze these compound words. Fill in the table with their parts.

1) Something -

2) Anyone -





# Closure



## 3. Listening Comprehension

You will watch a short video about corn plastic and then you will be asked to answer a few questions.

### CORN PLASTIC

Watch and listen to the video below **Corn Plastic** and then answer the questions.



Scan this QR code to watch the video!



How Stuff Works. (2008). Episode 1: Corn Plastic [Video]. Retrieved from: <https://www.youtube.com/watch?v=jwc-n3W9rNY>

1. Decide whether the following statements are **TRUE** or **FALSE**.

1) People realize we are living in a plastic society.

TRUE

FALSE

2) Plastics made from oil-based products last less than biodegradable plastics.

TRUE

FALSE

3) Currently lots of products are made out of plastic from the fabrics of our clothings to the glasses we drink water.

TRUE

FALSE

4) A biodegradable plastic made with corn could help alleviate an environmental problem with plastics.

TRUE

FALSE

5) The video describes some environmental impact of corn-based plastics.

TRUE

FALSE

6) The video describes the steps to produce plastic from corn.

TRUE

FALSE



## ACTIVITY 12:

### VOLCANOES AND EARTHQUAKES

#### Objectives

- To find specific information to complete a table.
- To reach a detailed understanding of the text to identify true and false information.
- To recognize definitions in the text.

### Preparation

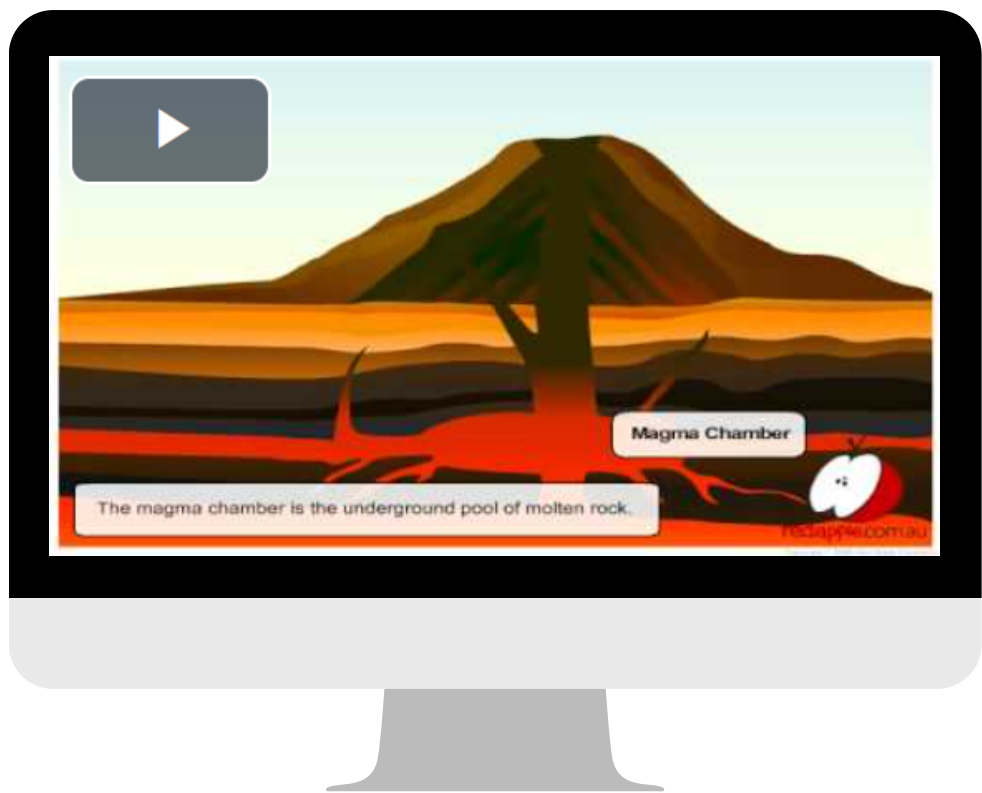


#### 1. Activating Prior Knowledge

Do the activity below. You will watch a short video to understand the parts of volcanoes, you will be asked to answer a few questions based on your previous knowledge and what you have learned from the video.

#### STRUCTURE OF A VOLCANO

Watch and listen to the video *The Structure of a Volcano* and then answer the questions.



Scan this QR code to watch the video!



Skwirk Online Education. (2012). Science Week - The Structure of a Volcano [Video]. Retrieved from: [https://www.youtube.com/watch?v=YS7\\_mGZeG\\_Q](https://www.youtube.com/watch?v=YS7_mGZeG_Q)

Match the types of volcanoes with their characteristics.

#### Type of volcanoes

A) Pipe

B) Magma chamber

C) Cone

D) Vent

E) Crater

#### Characteristics

- 1) The underground pool of molten rock.
- 2) Connects the magma member to the Earth's surface.
- 3) The opening in the Earth's surface from which gases and volcanic material scapes.
- 4) The bowel shaped depression at the top of the volcano.
- 5) The mountain formed by ash and lava that has hardened after being ejected from the vent.



# Volcanoes and Earthquakes



## Development



### 2. Reading Comprehension

- A) Read and listen to the text *Volcanoes and Earthquakes*.  
B) Based on the reading, do the next activity.

## Volcanoes and Earthquakes



### How many kinds of volcanoes are there?

- 1) Volcanoes are usually cone-shaped hills or mountains built around a vent connecting to reservoirs of molten rock, or magma, below the surface of the Earth. At times the molten rock is forced upwards by gas pressure until it breaks through weak spots in the Earth's crust. The magma erupts forth as lava flows or shoots into the air as clouds of lava fragments, ash, and dust. The accumulation of debris from eruptions cause the volcano to grow in size. There are four kinds of volcanoes:
- (2) \* **Cinder cones** are built of lava fragments. They have slopes of 30 degrees to 40 degrees and seldom exceed 1,640 feet (500 meters) in height. Sunset Crater in Arizona and Paricutin in Mexico are examples of cinder cones.
- (3) \* **Composite cones** are made of alternating layers of lava and ash. They are characterized by slopes of up to 30 degrees at the summit, tapering off to five degrees at the base. Mount Fuji in Japan and Mount St. Helens in Washington are composite cone volcanoes,
- (4) \* **Shield volcanoes** are built primarily of lava flows. Their slopes are seldom more than 10 degrees at the summit and two degrees at the base. The Hawaiian Islands are clusters of shield volcanoes. Mauna Loa is the world's largest active volcano, rising 13,653 feet (4,161 meters) above sea level.
- (5) \* **Lava domes** are made of viscous, pasty lava squeezed like toothpaste from a tube. Examples of lava domes are Lassen Peak and Mono Dome in California.

### Where is the Circle of Fire?

(6) The belt of volcanoes bordering the Pacific Ocean is often called the "Circle of Fire" or the "Ring of Fire." The Earth's crust is composed of 15 pieces, called plates, which "float" on the partially molten layer below them. Most volcanoes, earthquakes, and mountain building occur along the unstable plate boundaries. The Circle of Fire marks the boundary between the plate underlying the Pacific Ocean and the surrounding plates. It runs up the west coast of the Americas from Chile to Alaska (through the Andes Mountains, Central America, Mexico, California, the Cascade Mountains, and the Aleutian Islands) then down the east coast of AsiaTrom Siberia to New Zealand (through Kamchatka, the Kurile Islands, Japan, the Philippines, Celebes, New Guinea, the Solomon Islands, New Caledonia, and New Zealand). Of the 850 active volcanoes in the world, over 75% of them are part of the Circle of Fire.

### Which volcanoes have been the most destructive?

(7) The five most destructive eruptions from volcanoes since 1700 are as follows:

| Volcano                   | Date of eruption | Number killed | Lethal agent                                                      |
|---------------------------|------------------|---------------|-------------------------------------------------------------------|
| Mt. Tambora, Indonesia    | April 5, 1815    | 92.000        | 2.000 directly by the volcano, 80.000 from starvation afterwards. |
| Karkatoa, Indonesia       | Aug. 26, 1883    | 36.147        | 90% killed by a tsunami                                           |
| Mt. Pelee, Martinique     | Aug. 30, 1902    | 29.025        | Pyroclastic flows                                                 |
| Nevado del Ruiz, Colombia | Nov. 13, 1985    | 23.000        | Mud flow                                                          |
| Unzen, Japan              | 1792             | 14.300        | 70% killed by cone collapse; 30% killed by a tsunami              |

Compiled by the Science and Technology Department of the Carnegie Library of Pittsburgh. (1997).  
Volcanoes and Earthquakes. The Handy Science Answer Book (pp. 93, 94). Barnes and Noble Books. New York.

# Volcanoes and Earthquakes



## ACTIVITY

Answer the questions based on the text *Volcanoes and Earthquakes*.

1. Look at the whole text which is divided into three main parts and say what kind of information you find in each part. Write your answers in the boxes.

Part 1: How many kinds of volcanoes are there?

Part 2: Where is the Circle of Fire?

Part 3: Which volcanoes have been the most destructive?

2. Look at the whole text which is divided into three main parts and select the rhetorical elements it contains. The text contains mainly:

- ☐ A. Definitions / Descriptions / Classifications / Examples
- ☐ B. Instructions / Definitions / Classifications
- ☐ C. Definitions / Descriptions / Classifications



3. After reading the text, scan it to complete the information in the table in Spanish.

| Types of volcano             | Slopes (Pendientes)                                            | High in meters | Examples                                                                              | Composition                             |
|------------------------------|----------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------|-----------------------------------------|
| Cinder cones (Carboncillo)   | 1) ..... -40 grados.                                           | 2) .....       | 3) ..... en Arizona y el Paricutin en 4) .....                                        | 5) ..... de lava.                       |
| Composite Cones (Compuestos) | 6) ..... grados en la cumbre y 5 grados en la 7) .....         | X              | El Monte Fuji en 8) ..... y el Monte St. Helens en 9) .....                           | Capas alternas de 10) ..... y 11) ..... |
| Shield Cones (Escudo)        | 12) ..... grados en la cumbre and 13) ..... grados en la base. | 14) .....      | 15) ..... donde se encuentra el Mauna Loa, el volcán más grande y activo del planeta. | Flujos de Lava.                         |
| Lava Domes                   | X                                                              | X              | 16) ..... y 17) ..... en California.                                                  | Lava pastosa.                           |



# Volcanoes and Earthquakes



6. Read intensively the text to decide whether the statements are **TRUE** or **FALSE**.

1) If you live in the central or eastern United States, you have the possibility of seeing a volcano.

TRUE

FALSE

2) The number of volcanoes that makes part of the “Ring of Fire” is about 637.

TRUE

FALSE

3) The world’s biggest active volcano is in Hawaii.

TRUE

FALSE

4) Volcanoes are found everywhere in the Earth's crust.

TRUE

FALSE

5) The biggest volcano ever recorded (in terms of volume of material erupted and catastrophic effects) is Tambora in Indonesia.

TRUE

FALSE

6) The eruptions of Mt. Tambore and Unzen, killed more people than karkatoa and El Nevado del Ruiz in Colombia.

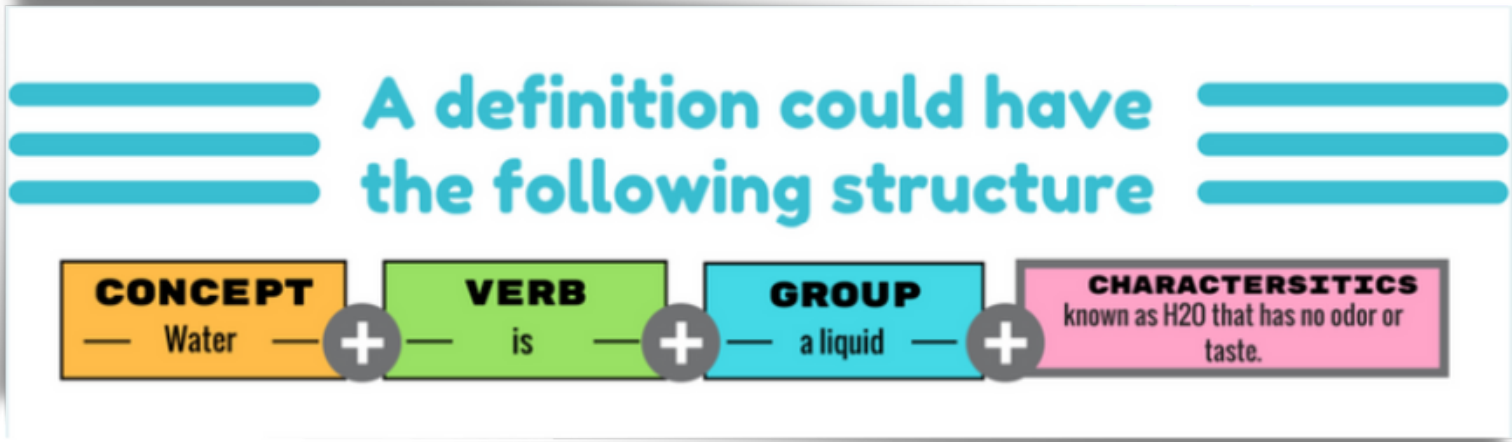
TRUE

FALSE

# Volcanoes and Earthquakes



5. Analyze the following picture.



Based on the text and the previous picture complete the blanks with the parts of the definitions.

| CONCEPT                     | VERB | CLASS                    | CHARACTERISTICS                                                                   |
|-----------------------------|------|--------------------------|-----------------------------------------------------------------------------------|
| 1) A <input type="text"/>   | is   | a <input type="text"/>   | which transfers <input type="text"/> from depth to Earth's <input type="text"/> . |
| 2) The <input type="text"/> | is   | the <input type="text"/> | bordering the <input type="text"/> .                                              |

- surface
- circle of fire
- volcano
- Pacific Ocean
- chimney
- belt of volcanoes
- molten rocks

6. Analyze the following words taken from the text . Write 1 if derived, 2 if compound as the following example:

| English Words               | Derived / Compound      | Parts                                             |
|-----------------------------|-------------------------|---------------------------------------------------|
| 1) Upwards Paragraph 1      | 2                       | up-wards                                          |
| 2) Accumulation Paragraph 1 | A) <input type="text"/> | B) <input type="text"/> -ation                    |
| 3) Eruptions Paragraph 1    | C) <input type="text"/> | D) <input type="text"/> - E) <input type="text"/> |
| 4) Usually Paragraph 1      | F) <input type="text"/> | G) <input type="text"/> - H) <input type="text"/> |
| 5) Toothpaste Paragraph 1   | I) <input type="text"/> | J) <input type="text"/> - K) <input type="text"/> |
| 6) Earthquake Paragraph 2   | L) <input type="text"/> | M) <input type="text"/> - N) <input type="text"/> |
| 7) Building Paragraph 2     | O) <input type="text"/> | P) <input type="text"/> - Q) <input type="text"/> |



# Volcanoes and Earthquakes



## Closure



### 3. Listening Comprehension

#### TECTONIC PLATES

Watch and listen to the video *Tectonic Plates* and fill in the required information.



Scan this QR code to watch the video!



Geo Dharma. (2010). *Tectonic Plates* [Video].  
Retrieved from:  
<https://www.youtube.com/watch?v=ryrXAGY1dmE>

#### 1. Write the missing words in English.

It happens ..... hot rock rises heated by the earth's core, near the surface the rocks spreads in two directions and goes sideways. It begins to lose heat, ..... the much cooler rock sinks, through this spreading process the earth's crust is very slowly dragged apart and it's this that ultimately causes the continents to ..... . Where the plates collide, the rock on the seafloor containing carbon from the dead plankton is carried deep into the ..... . As it descends, this layer of rock is heated, so the rock melts releasing carbon dioxide and gas is returned back into the atmosphere, during an ..... . The remarkable cycle is complete.

#### 2. Decide whether the following statements are TRUE or FALSE.

1) The video and the previous text contain the same type of information.

TRUE

FALSE

2) Only the text exemplifies the different types of volcanoes.

TRUE

FALSE

3) The video and the text refer the "Ring of Fire"

TRUE

FALSE

4) The video and the text describe how continents move across the Earth's surface.

TRUE

FALSE

5) The video and the text explain how volcanoes are formed.

TRUE

FALSE

UNIVERSIDAD DEL VALLE

# **Actividades complementarias asistidas por tecnología: Ciencias e Ingenierías I**

## **Answer sheets**

### **Autores**

Asnoraldo Cadavid Ríos  
Marcela del Pilar Castellanos Olmedo  
Luis Alfredo Velasco Guerrero





## ACTIVITY 1:

### THE SCIENTIFIC METHOD

#### Preparation

##### 1. Activating Prior Knowledge

- A) 1. Ask a question.  
2. Research your topic.  
3. Construct a hypothesis.  
4. Experiment.  
5. Collect and record data.  
6. Come to a conclusion.

#### Development

##### 2. Reading Comprehension

- 1) 1. FACTS.  
2. DISCARD.  
3. COLLECT.  
4. MODEL.  
5. SCIENCE.  
6. COOKIE.  
7. ATOM.

2) **their:** Scientists  
**it:** Scientific theory  
**such parts:** Positive and negative parts  
**they:** Physicists.
- 3) FALSE  
FALSE

4) **A:** PARAGRAPH 4  
**B:** PARAGRAPH 1  
**C:** PARAGRAPH 3  
**D:** PARAGRAPH 2

#### Closure

##### 3. Listening Comprehension

- 1) Process  
Produce  
Results  
Question

2) 1. All of them.  
2. Bring more questions.  
3. Observation and research.
- 3) FALSE

# What is Chemistry?



## Preparation

### 1. Activating Prior Knowledge

- |          |          |
|----------|----------|
| 1) TRUE  | 5) FALSE |
| 2) FALSE | 6) FALSE |
| 3) TRUE  | 7) TRUE  |
| 4) FALSE |          |

## ACTIVITY 2:

### WHAT IS CHEMISTRY?

## Development

### 2. Reading Comprehension

- |                                                                                                                                                                                                                                  |                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| 1) IS<br>BRANCH OF SCIENCE<br>STUDIES<br>INTERACTIONS<br>MATTER<br>STUDY<br>ARE                                                                                                                                                  | 3) <b>a)</b> PARAGRAPH 3<br><b>b)</b> PARAGRAPH 1<br><b>c)</b> PARAGRAPH 4<br><b>d)</b> PARAGRAPH 2 |
| 2) <b>Root:</b> <i>biolog</i> <b>Suffix:</b> <i>-ists</i><br><b>Root:</b> <i>Equal</i> <b>Suffix:</b> <i>-ly</i><br><b>Root:</b> <i>Chemic</i> <b>Suffix:</b> <i>-al</i><br><b>Root:</b> <i>Behavi</i> <b>Suffix:</b> <i>-or</i> | 4) FALSE<br>TRUE<br>TRUE<br>FALSE<br>TRUE                                                           |

## Closure

### 3. Listening Comprehension

- |                                                            |                |
|------------------------------------------------------------|----------------|
| 1) <b>B.</b> 3 and 4                                       | 3) <b>B.</b> 2 |
| 2) <b>C.</b> Descriptive – Cause/Effect –<br>Instructional |                |





## Preparation

### 1. Activating Prior Knowledge

- 1. In the picture number one, the plants were fertilized; in the picture number two, they were not.
- 2. They need to use fertilizers in their crops.

## Development

### 2. Reading Comprehension

- 1) **Suffix:** -tion  
**Suffix:** -an  
**Suffix:** -ly  
**Suffix:** -er  
**Suffix:** -teenth

**Suffix:** -ship  
**Prefix:** non-  
**Prefix:** in-  
**Suffix:** -al
- 2) 1. All are correct  
2. They used animal waste as nutrients for the land  
3. All are correct  
4. None of the above  
5. Phosphorus, potassium, calcium, copper, iron zinc, nitrate ions and other elements

4) (1) Exhaust  
(2) Manure  
(4) Contamination  
(7) Bacterium
- 3) TRUE  
FALSE  
TRUE  
FALSE

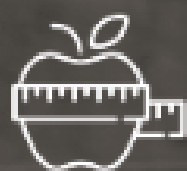
5) (1) Method  
(2) Contamination  
(3) Activities  
(4) Production
- 6) **Gram.:** Noun  
**Suffix:** -al  
**Suffix:** -ers **Gram.:** Noun  
**Suffix:** fertilize- **Gram.:** Noun  
**Suffix:** fertilize- **Gram.:** Verb

7) Human dependence on chemicals to produce food for a growing population in the world has forced man to look for alternative sources to fertilize nutrient depleted lands.

## Closure

### 3. Listening Comprehension

- TRUE
- FALSE
- TRUE
- TRUE
- FALSE



## ACTIVITY 4:

### HUMAN ENERGY REQUIREMENTS

### Preparation

#### 1. Activating Prior Knowledge

Scientists suppose other effects in your body sugar level : **6**  
Glucose is used by your muscles or it is stored for later use. : **4**  
Research findings. : **8**  
Glucose levels increase in your bloodstream. : **3**  
After a short period of time, your muscles are affected by the fatty diet. : **5**  
Eating fatty food has adverse effects in your health such as obesity and weight increase. : **2**  
Time periods you are exposed to have a large intake of fatty food. : **7**

### Development

#### 2. Reading Comprehension

- 1) 1. Food  
2. Energy  
3. Carbohydrate  
4. Protein  
5. Margarine  
6. Vegetable  
7. Pizza  
8. Sugar  
9. Soft drink

2) A) 7  
B) 2  
C) 5  
D) 8

E) 4  
F) 3  
G) 6
- 3) 1) A  
2) D  
3) C  
4) B

4) 1) Opposition  
2) Exemplification  
3) Reinforcement  
4) Numeration  
5) Condition
- 5) Active  
Passive  
Passive  
Passive  
Active  
Active  
Passive  
Active

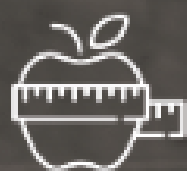
### Closure

#### 3. Listening Comprehension

- 1) 3, 5, 7, 1, 8, 2, 6, 4.
- 2) FALSE  
TRUE  
TRUE  
TRUE  
TRUE



# Human Energy Requirements



## Preparation

### 1. Activating Prior Knowledge

Open answer.

## Development

### 2. Reading Comprehension

- 1) **A)** Knife                      **D)** Carbon  
    **B)** Sharpener           **E)** Iron  
    **C)** Hardness           **F)** Brittle

2) Open answer.

- 3) **A)** 6  
    **B)** 4  
    **C)** 3  
    **D)** 5  
    **E)** 1  
    **F)** 2

- 4) FALSE  
    TRUE  
    FALSE  
    TRUE  
    TRUE

## Closure

### 3. Listening Comprehension

Open answers.

## ACTIVITY 5: KNIVES AND STEEL

- 5) **A)** Tests  
    **B)** Edge  
    **C)** Forces  
    **D)** Forces  
    **E)** Range  
    **F)** Compositions  
    **G)** Accident  
    **H)** Blade

- 6) **1)** Afilado  
    **2)** Cortante  
    **3)** Dar  
    **4)** Procesamiento  
    **5)** Separación



## Preparation

### 1. Activating Prior Knowledge

Open answer.

## ACTIVITY 6:

### LASERS

## Development

### 2. Reading Comprehension

- 1) 1. Characteristics, definition and applications of the laser beam.  
2. La amplificación de la luz a través de la emisión estimulada de la radiación.
- 2) **A:** PARAGRAPH 1  
**B:** PARAGRAPH 3  
**C:** PARAGRAPH 2  
**D:** PARAGRAPH 4  
**E:** PARAGRAPH 5
- 3) **A:** FIRST,  
**B:** THEN,  
**C:** AFTER THAT,  
**D:** EVENTUALLY,
- 4) **A:** LASER  
**B:** CONVENTIONAL  
**C:** LASER  
**D:** CONVENTIONAL  
**E:** LASER  
**F:** CONVENTIONAL

## Closure

### 3. Listening Comprehension

- 1) FALSE  
TRUE  
TRUE  
FALSE





Preparation

1. Activating Prior Knowledge

ACROSS

- 1: DNA
- 3: Research
- 5: Cattle
- 8: Scientist

DOWN

- 2: Cow
- 6: Agriculture
- 10: Milk

Development

2. Reading Comprehension

- 1) 1. Dairy

2. Bred

3. Genome

4. Yield
5. Holstein

6. Fertility

7. Milk
- 3) 1. To ferlitize

2. Fertile

3. Preservation

4. Preserved

5. Research

6. Researchable
7. Collaborate

8. Collaborative

9. Produce

10. Productive

11. Agriculture
- 2) 1. Agricultural Research Service

2. Animal and Natural Resources Institute

3. University of Minnesota

4. Deoxyribonucleic Acid
- 4) A. 3

B. 1

C. 4

D. 2

Closure

3. Listening Comprehension

Open answers.

# Engineering Ethics

## Preparation

### 1. Activating Prior Knowledge

Open answer.

## Development

### 2. Reading Comprehension

1) Open answers.

2) Open answers.

3) 1. The way engineers use their specialized knowledge.

2. A helpful person in society.

3. In order to protect the public and preserve the integrity and name of the profession.

4. But there is a considerable agreement among engineers as to what constitutes ethical behavior.

5. Because some ethical resolutions are difficult and uncertain.

## ACTIVITY 8:

### ENGINEERING ETHICS

4) 1. NO

2. YES

3. NO

4. YES

5. NO

5) 1. Absolute obligation

2. Moral rightness

3. Requirement

4. Suggestion

5. Synonym of must

6) A) Un ingeniero responsable.

B) Un ingeniero irresponsable o corrupto.

C) Comportamiento ético.

D) Los diversos códigos éticos.

E) La junta de acreditación para la ingeniería y la tecnología.

## Closure

### 3. Memory Game

- EASY - DIFFICULT
- ETHICAL - UNETHICAL
- RESPONSIBLE - IRRESPONSIBLE
- OBJECTIVE - SUBJECTIVE
- SAFE - DANGEROUS

- TRUTHFUL - DECEITFUL
- HONEST - DISHONEST
- SUITABLE - IMPROPER
- FAITHFUL - DISLOYAL
- USEFUL - USELESS





## ACTIVITY 9:

### CONTRIBUTIONS OF THE GREEKS

#### Preparation

##### 1. Activating Prior Knowledge

Open answer.

#### Development

##### 2. Reading Comprehension

1) Open answer.

- |            |          |
|------------|----------|
| 2) 1. TRUE | 6. FALSE |
| 2. TRUE    | 7. TRUE  |
| 3. TRUE    | 8. FALSE |
| 4. FALSE   | 9. FALSE |
| 5. FALSE   | 10. TRUE |

- |                  |                   |
|------------------|-------------------|
| 5) 3) Experiment | 10) Protect       |
| 4) Verification  | 11) Plan          |
| 5) Apply         | 12) Navigate      |
| 6) Think         | 13) Understanding |
| 7) Builder       |                   |
| 8) Construct     |                   |
| 9) Communication |                   |

- |               |             |
|---------------|-------------|
| 3) 1. DERIVED | 5. DERIVED  |
| 2. DERIVED    | 6. COMPOUND |
| 3. DERIVED    | 7. DERIVED  |
| 4. COMPOUND   |             |

- 4) A. The Greek architecton  
B. The Greeks  
C. The breakwater  
D. The main tunel  
E. The ruler Pericles  
F. The tunel construction  
G. Capstans and Pulleys

6) Open answers.

#### Closure

##### 3. Listening Comprehension

Open answer.



## Preparation

### 1. Activating Prior Knowledge

- 1) Open answer.
- 2) All are right.
- 3) is responsible for designing, building and maintaining all public infrastructures necessary for a growing population.

## Development

### 2. Reading Comprehension

- 1) Open answers.
- 2) Open answers.
- 3) **A)** Environmental Engineers.  
**B)** Construction Engineers & Management.  
**C)** Geotechnical Engineers.  
**D)** Hydraulic and Water Resources Engineers.  
**E)** Geodetic Engineers.  
**F)** Transportation Engineers.  
**G)** Structural Engineers.
- 4) **3)** Worker      **11)** Pollution  
**4)** Designer    **12)** Treatment  
**5)** Pavement    **13)** Measure  
**6)** Produce      **14)** Location  
**7)** Operate      **15)** Elevate  
**8)** Irrigate      **16)** Alignment  
**9)** Erosion      **17)** Employment  
**10)** Manage      **18)** Governement
- 5) Open answers.
- 6) Engine: -er-ing  
Manage: -able  
Environ: -ment-al  
Large: -est  
Streng: -th  
Dur: -ability  
Work: -less-ness  
Time: -li-ness  
Design: -er  
Know: -ledge  
Drain: -age  
Treat: -ment

## Closure

### 3. Listening Comprehension

- 1) Open answer.
- 2) Open answer.

## ACTIVITY 10: CIVIL ENGINEERING





## Preparation

# ACTIVITY 11: PLASTICS

### 1. Activating Prior Knowledge

- 1) 1. Spoon.  
2. Carpet.  
3. Frisbee.  
4. Brush.  
5. Bottle.
6. Bucket.  
7. Toy.  
8. Bag.  
9. Button.  
10. Switch.

## Development

### 2. Reading Comprehension

- 1) A. 2  
B. 1  
C. 3
- 2) 1. Plastic is  
2. an artificial substance  
3. that can be shaped when soft  
4. into many different forms
- 3) GERMAN  
ACTUALLY  
ONCE
- 4) 2. COMPANY  
3. VARIETY  
PROPERTIES  
4. MOLECULES  
POLYTHYLENE
- 5) 1. 1920  
2. 1953  
3. Middle 19th Century  
4. 1863  
5. 1871
- 6) 1. Shape  
2. -able  
3. Understand  
4. -ing  
5. Avail  
6. -able  
7. Chemic
8. -al  
9. Americ  
10. -an  
11. Print  
12. -er  
13. Exact  
14. -ly
- 7) 1. Some - thing  
2. Any - one

## Closure

### 3. Listening Comprehension

- 1) 1. FALSE  
2. FALSE  
3. TRUE
4. TRUE  
5. TRUE  
6. TRUE



## Preparation

### 1. Activating Prior Knowledge

- A) 1. B  
2. A  
3. D  
4. E  
5. C

## Development

### 2. Reading Comprehension

1) Open answers.

2) A. Definitions / Descriptions /  
Classifications / Examples

- |                  |                      |
|------------------|----------------------|
| 3) 1) 30         | 10) lava/ceniza      |
| 2) 500           | 11) lassen peak/mono |
| 3) Sunset crater | dome                 |
| 4) México        | 12) 10               |
| 5) fragmentos    | 13) 2                |
| 6) 30            | 14) 4,161            |
| 7) base          | 15) Hawai            |
| 8) Japón         | 16) lassen peak/mono |
| 9) Washington    | dome                 |
|                  | 17) lassen peak/mono |
|                  | dome                 |

- |             |         |
|-------------|---------|
| 4) 1) FALSE | 4) TRUE |
| 2) TRUE     | 5) TRUE |
| 3) TRUE     | 6) TRUE |

5) 1) volcano, chimney,  
molten rocks, surface  
2) circle of fire, belt  
of volcanoes, Pacific  
Ocean

- |            |          |
|------------|----------|
| 6) A. 1    | J. Tooth |
| B. Accumul | K. paste |
| C. 1       | L. 2     |
| D. Erupt   | M. Earth |
| E. ions    | N. quake |
| F. 1       | O. 1     |
| G. Usual   | P. Build |
| H. ly      | Q. ing   |
| I. 2       |          |

## Closure

### 3. Listening Comprehension

1) because, eventually, move, earth, eruption.

- 2) 1) FALSE  
2) TRUE  
3) FALSE  
4) FALSE  
5) FALSE

## ACTIVITY 12: VOLCANOES AND EARTHQUAKES



# Acerca de nosotros

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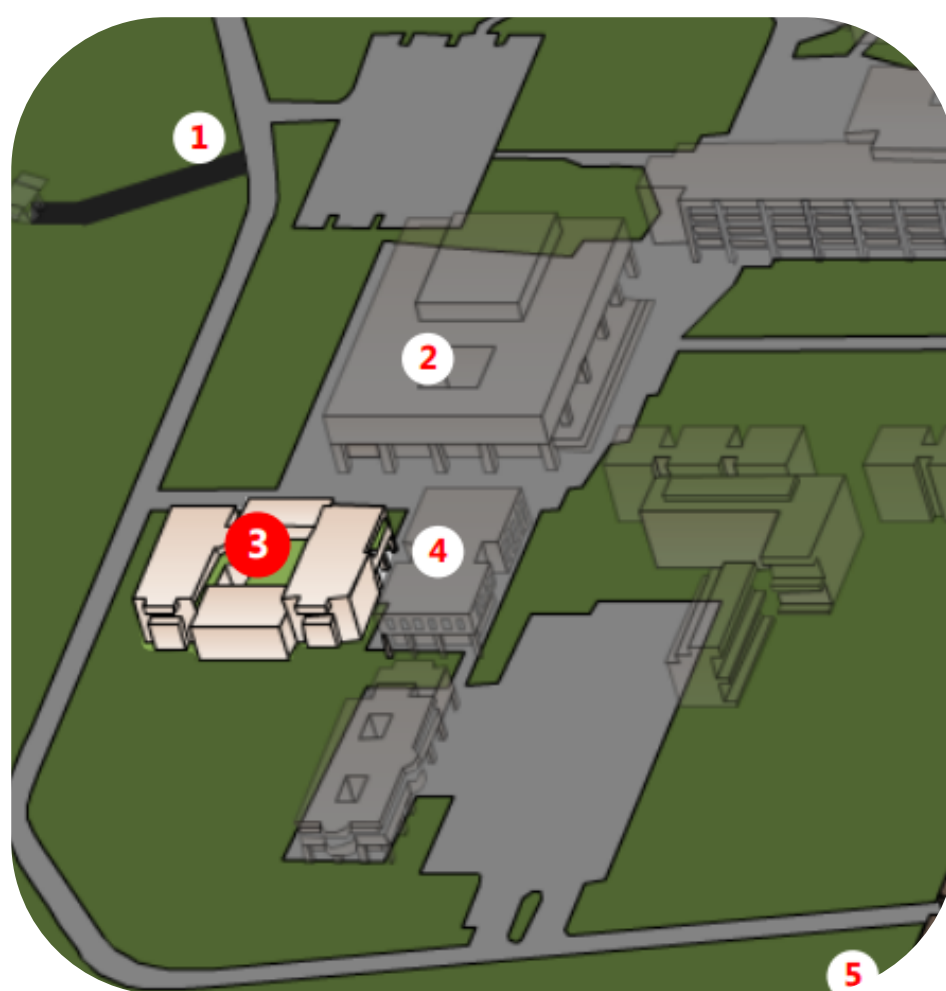
**UNIVERSIDAD DEL VALLE**  
**FACULTAD DE HUMANIDADES**  
**ESCUELA DE CIENCIAS DEL LENGUAJE**  
**2023**



**ANEXOS**

# El Campus Virtual

El Campus Virtual de la Universidad del Valle es una herramienta a disposición de estudiantes y profesores cuyo fin es fomentar la utilización de nuevas tecnologías en la práctica docente. Este campus utiliza la plataforma de licencia libre *Moodle 3,5* como interfaz y brinda una amplia variedad de herramientas interactivas como foros, cuestionarios, encuestas, entre otras.



1. Entrada vehicular: Carrera 86
2. Biblioteca Mario Carvajal
3. Edificio E18 (CREE)
4. Edificio E17. Escuela de Ciencias del Lenguaje
5. Entrada Peatonal: Avenida Pasoancho

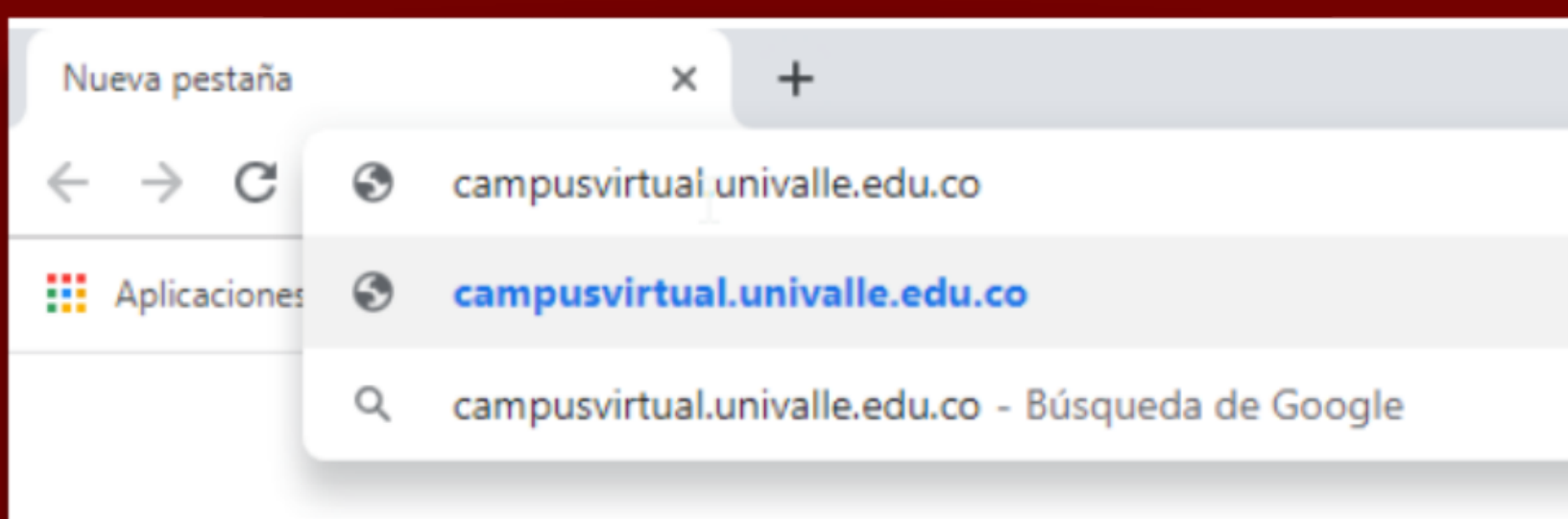
Localización Edificio E18 (CREE)

Para ingresar al campus, se requiere que el docente y/o el estudiante cuente con una cuenta de correo electrónico institucional, la cual es gratuita y se genera automáticamente una vez vinculados a la institución. Sin embargo, si usted no posee una cuenta aún o presenta problemas para ingresar, debe dirigirse a la **oficina del Campus Virtual** localizada en el **segundo piso del edificio E18 CREE**.



# Ingresar al Campus Virtual:

1. En su navegador ingrese a:  
**<https://campusvirtual.univalle.edu.co>**



2. En la página principal del campus, busque el recuadro de acceso y escriba los datos.

a. Si es DOCENTE:

- Su nombre de usuario es el número de su cédula sin espacios.

- Si es USUARIO NUEVO, su contraseña es el número de su cédula sin espacios. Si olvidó su clave puede dar clic en ¿Olvidó su nombre de usuario o contraseña?.

b. Si es ESTUDIANTE:

- Su nombre de usuario es su código de estudiante (sin los dos primeros números del año) seguido por un guión y el código de su programa académico. Por ejemplo: 1056899-3625

- Si es USUARIO NUEVO, su contraseña es la primera letra del primer nombre (en mayúscula), seguido del código estudiantil (sin los dos primeros números del año) y la primera letra del primer apellido (en mayúscula). Por ejemplo: L1056899T

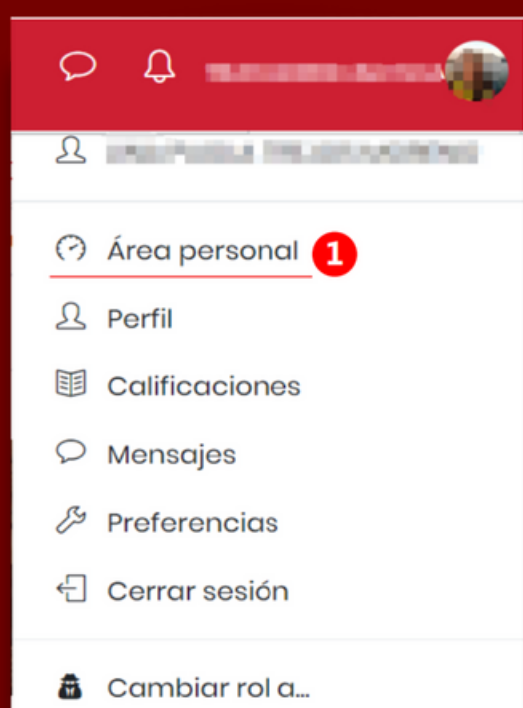
Si olvidó su clave puede dar clic en ¿Olvidó su nombre de usuario o contraseña?.

A screenshot of the login form on the campus virtual page. It features two input fields: 'Nombre de usuario' with a person icon and 'Contraseña' with a lock icon. Below these fields is a checkbox labeled 'Recordar nombre de usuario'. A red 'Acceder' button is positioned below the checkbox. At the bottom of the form, there is a link that reads '¿Olvidó su nombre de usuario o contraseña?'.

3. Dé click en **ACCEDER.**

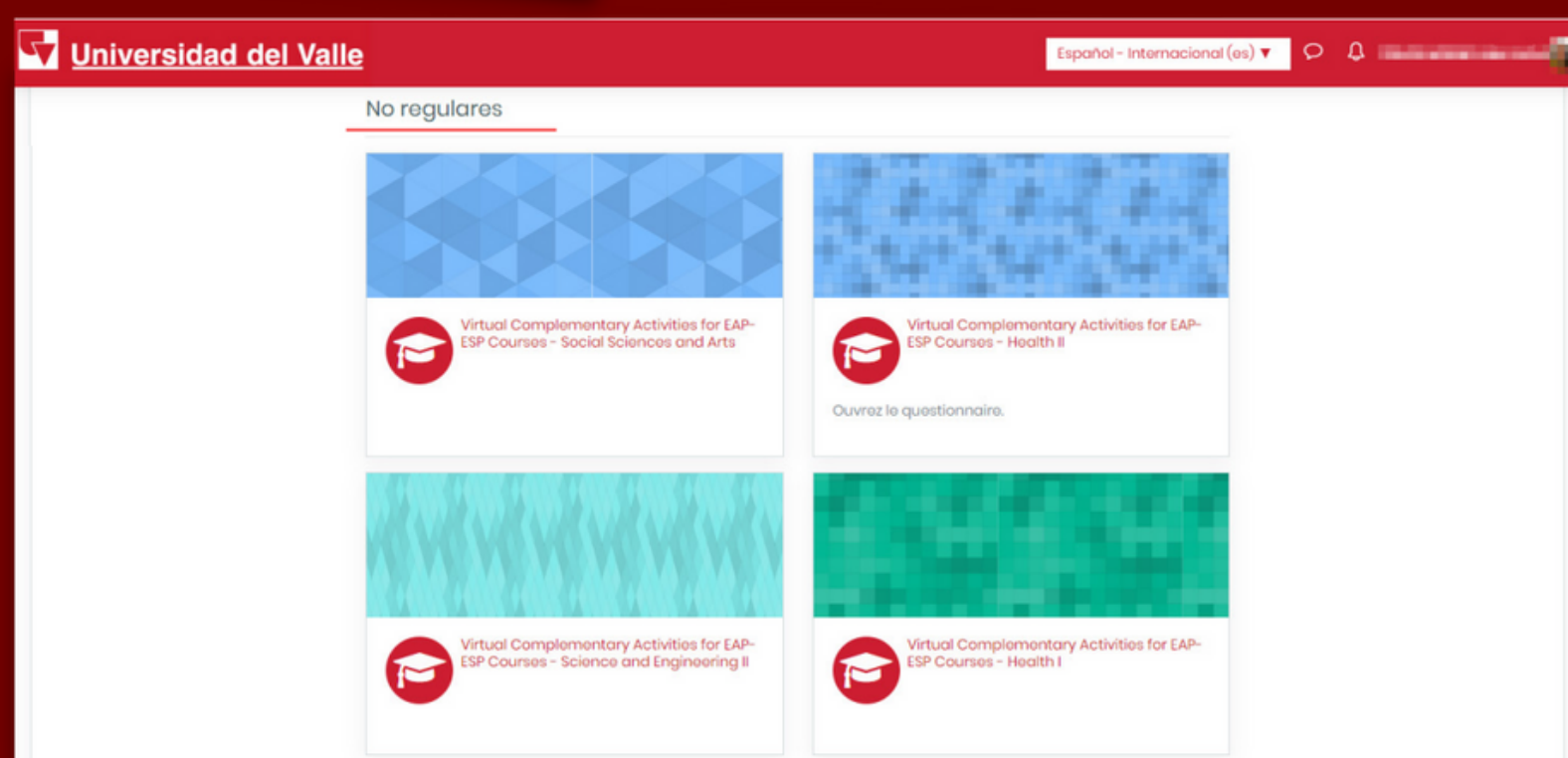
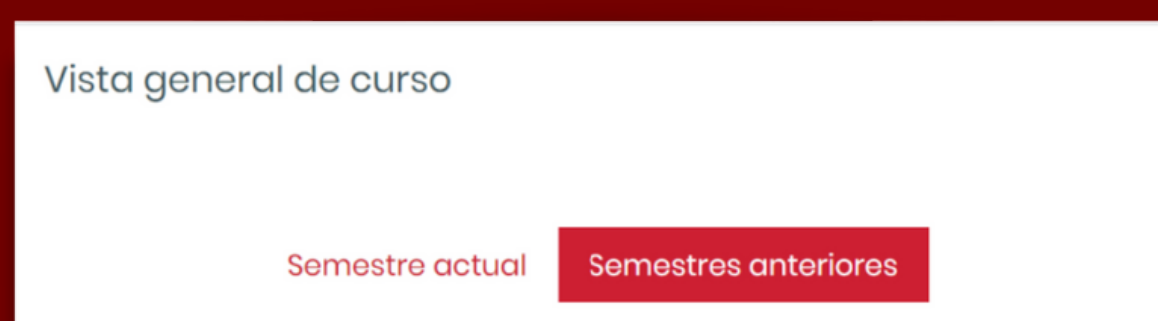
# Cómo ingresar al material:

1. Ingrese a su Campus Virtual, sección **ÁREA PERSONAL**.\*



\* El Área Personal es la sección que se abre por defecto al ingresar al Campus Virtual. Si usted presenta inconvenientes para encontrarla, en la parte superior derecha encontrará su nombre y una imagen, dé clic en la imagen y seleccione Área Personal, tal y como se muestra en la imagen.

2. En el Área Personal, busque la sección **Cursos** y seleccione la opción **SEMESTRES ANTERIORES**. Desplácese hacia abajo hasta encontrar la sección **CURSOS NO REGULARES**. Dé clic en el módulo al cual desea ingresar.





# Descripción de los módulos

Cada módulo se compone de un promedio de **10 a 12 actividades**, las cuales son autónomas entre sí y no dependen de la anterior, el orden asignado obedece a otros criterios como por ejemplo los niveles de exigencia de la lengua y los contenidos del curso presencial. Las actividades tienen entre **7 a 9 ejercicios** divididos en tres momentos: **preparación, desarrollo y cierre**. Adicionalmente, cada módulo contiene una introducción, un manual de gramática, y una página de créditos.

A continuación se explican en detalle:

## Introducción

Es por defecto la pestaña inicial de todos los cursos. En la introducción, se explica el propósito del material de apoyo y cómo está organizado.

The screenshot shows the course introduction page for 'Virtual Complementary Activities for EAP-ESP Courses - Science and Engineering I' at Universidad del Valle. The page is divided into three main sections, numbered 1, 2, and 3.

**1. Nombre del curso:** The course title is 'Virtual Complementary Activities for EAP-ESP Courses - Science and Engineering I'.

**2. Pestaña de introducción:** The 'Introduction' tab is selected in the navigation bar. Below the navigation bar, there is a list of 12 activities: Act. 1: Scientific Method, Act. 2: What is Chemistry?, Act. 3: Using Chemistry to Feed the World, Act. 4: Human Energy Requirements, Act. 5: Knives and Steel, Act. 6: Lasers, Act. 7: Scientists Study Holstein Milk Production, Act. 8: Engineering Ethics, Act. 9: Contributions of the Greeks, Act. 10: Civil Engineering, Act. 11: Plastics, and Act. 12: Volcanoes and Earthquakes. There are also links for 'Grammar Manual' and 'Credits'.

**3. Introducción:** The 'Introduction' section contains a title 'Virtual Complementary Activities for EAP-ESP Courses I' and a subtitle 'INTRODUCTION'. The text describes the activities as offering appropriate material for exploring different levels of an EAP-ESP class in different disciplines of Science and Engineering. It states that there are 12 activities to explore, each one divided into 3 sections: preparation, development, and closure. The first section explores the students' prior knowledge; the second section provides the opportunity for learning the language by using it in context within a specific topic which is relevant and interesting for the student scope of study. Finally, the closure section aims to expand what the students have learned throughout the previous sections.

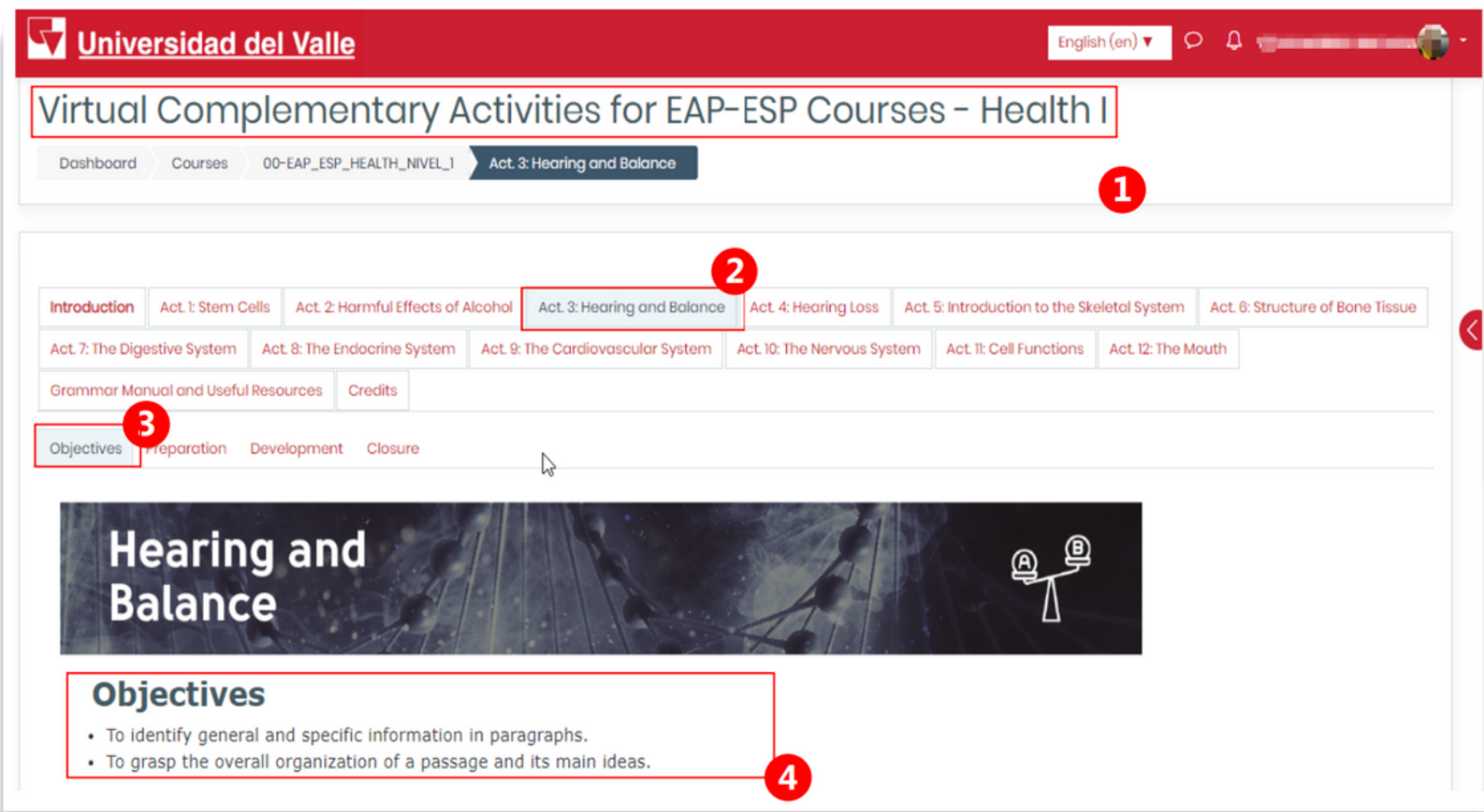
1. Nombre del curso

2. Pestaña de introducción

3. Introducción

# Actividades complementarias asistidas por tecnología

Cada actividad contiene unos **objetivos** que guían al estudiante durante la consecución de la tarea, la cual, como se había mencionado anteriormente, se desarrolla en tres momentos: **preparación**, **desarrollo** y **cierre**.



1.

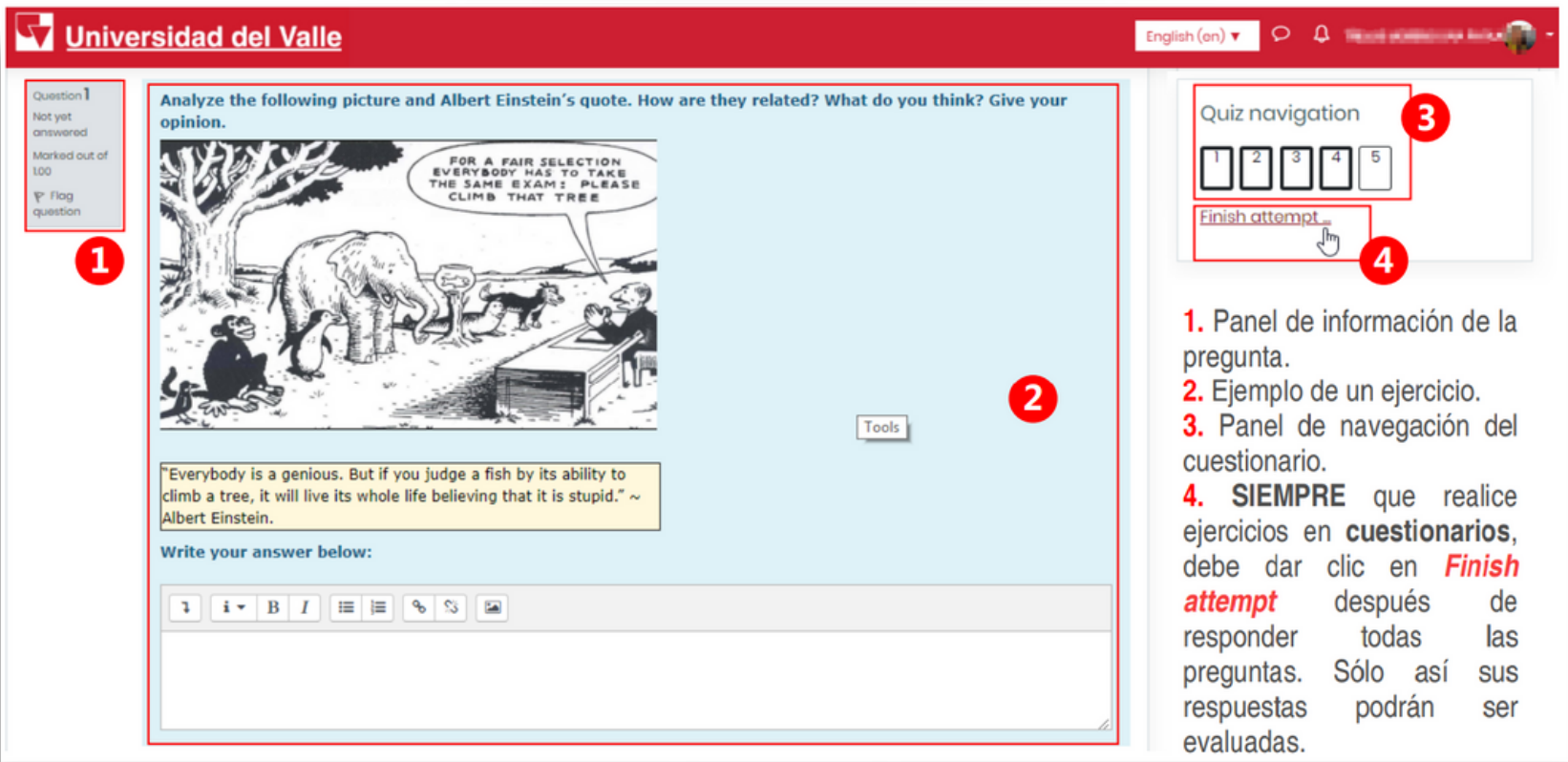
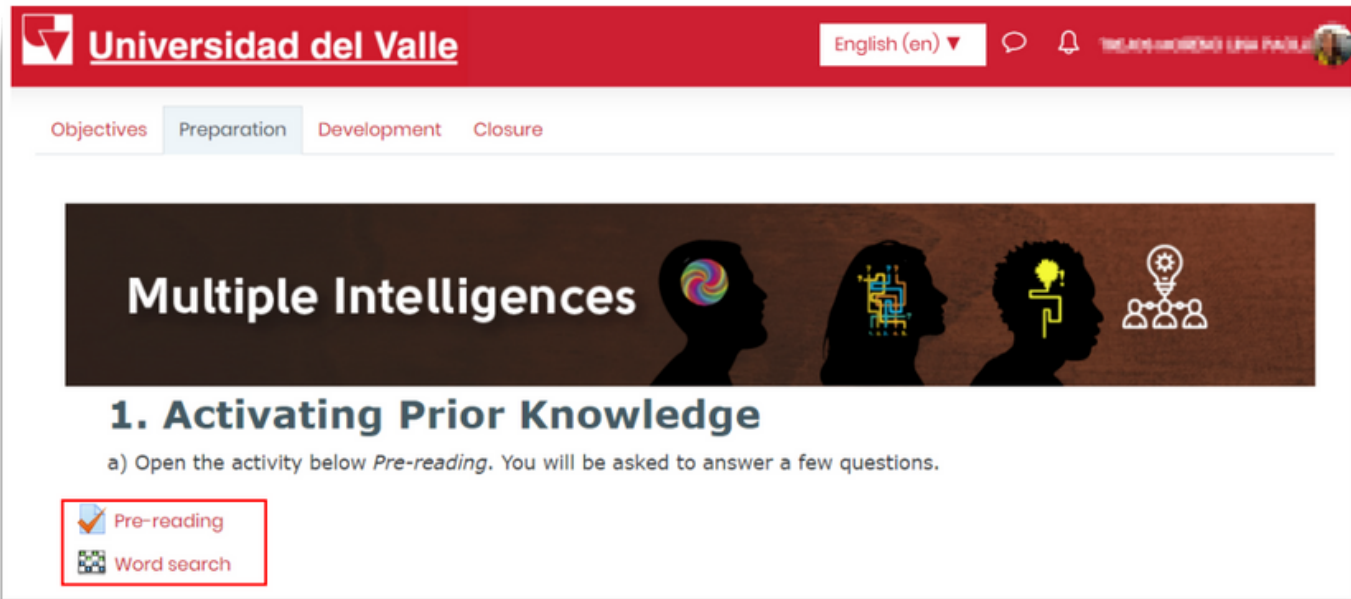
Nombre del módulo
2.

Nombre de la actividad
3.

Pestaña de objetivos
4.

Ejemplos de objetivos de una actividad

En el momento de **preparación** se exploran los conocimientos previos (*background knowledge*) del estudiante y se introduce el tema central. Los ejercicios parten desde clasificación de palabras, pasando por lecturas cortas y vídeos en inglés, hasta juegos en línea y preguntas abiertas para expresar opiniones.



1.

Panel de información de la pregunta.
2.

Ejemplo de un ejercicio.
3.

Panel de navegación del cuestionario.
4.

SIEMPRE que realice ejercicios en cuestionarios, debe dar clic en **Finish attempt** después de responder todas las preguntas. Sólo así sus respuestas podrán ser evaluadas

Ejemplo de un ejercicio del momento de preparación



En el momento de **desarrollo** se encuentra una lectura principal de tipo académico y un cuestionario que reúne una serie de ejercicios basados en la lectura, tales como preguntas de opción múltiple, falso/verdadero, preguntas abiertas, completar tablas, entre otras.

Universidad del Valle

English (en)

TEL: 05 67000000 J. VALLE

Objectives

Preparation

Development

Closure

Global Overpopulation

2. Reading Comprehension

a) Read and listen to the text below *Global Overpopulation, Yet Cultural Extinction*

Global Overpopulation, Yet Cultural Extinction

McKinney, M., Schoch, R. (1996). Global overpopulation, yet cultural extinction. In *Environmental Science: Systems and Solutions*, pp 134-135. Minneapolis: West Publishing Company.

b) Based on the reading, do the activity below *Reading Comprehension*.

Reading Comprehension

1. Enlace a la lectura principal
2. Cuestionario con ejercicios basados en la lectura

Universidad del Valle

English (en)

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Information

Flag question

Reading Comprehension

Answer the questions based on the text *Global Overpopulation, Yet Cultural Extinction*.

Question 1

Tries remaining: 1

Marked out of 20.00

Flag question

Match each keyword from the text with its appropriate part of speech, and its meaning.

| Words       | Parts of Speech | Meaning | Check |
|-------------|-----------------|---------|-------|
| Indigenous  |                 |         |       |
| Cultural    | Verb            |         |       |
| Extinction  | Adjective       |         |       |
| Mainstream  | Adverb          |         |       |
| Land        |                 |         |       |
| Environment |                 |         |       |
| Peoples     |                 |         |       |
| Population  |                 |         |       |
| Preserve    |                 |         |       |
| Widely      |                 |         |       |

Quiz navigation

Skimming - Scanning

Intensive reading

Finish attempt ...

Ejemplos de ejercicios al momento de desarrollo

Universidad del Valle

English (en)

Question 6

Tries remaining: 1

Marked out of 100

Flag question

Based on TABLE 1, classify the indigenous peoples in the map according to the region they belong to.

6

2

4

3

5

1

Masai

Gond

Ethnic Mongolians

Maoris

Incas

Inuit (Eskimo)

Check

Next page



Para la presentación de las lecturas, se ha creado una aplicación interactiva en formato **HTML5** que permite ser visualizada en diferentes dispositivos tales como celulares y tablets.

En esta aplicación, el estudiante cuenta con el texto tanto en forma escrita como oral. También, cuenta con una barra de navegación llamada **Menú de Análisis Textual**, la cual permite visualizar diferentes elementos gramaticales y sintácticos en el texto, como por ejemplo: palabras claves, conectores lógicos, referentes, frases nominales, cognados, palabras compuestas, derivación, entre otros.

# Could Stem Cells Patch Up a Broken Heart?

[Read and Listen](#)[Keywords](#)[Vocabulary](#)[Cognates](#)[Derivation](#)[Compound Words](#)[Present Perfect](#)[Logical Relationships](#)[Referents](#)[Modal Verbs](#)

Passive Voice

## Read and Listen

### COULD STEM CELLS PATCH UP A BROKEN HEART?

(1) Scientists have identified the "master" stem cell that gives rise to the three types of heart cells, possibly opening the door for new methods of pharmaceutical research and heart therapies such as growing a patch to repair cardiac tissue damaged by heart disease, according to a study published in Nature.

(2) The research illuminates a crucial facet of how heart tissue develops and shows why past studies to repair heart tissue with stem cells had poor results: the cells used were not the heart tissue progenitors that lead author Kenneth Chien and his team identified. The researchers then purified the cells, cloned them and tracked their journey from single stem cell to the three major lineages of heart cells — smooth muscle, cardiomyocyte [or striated] muscle and endothelial cells [U.S. News and World Report], which line the inside of the heart. For years, scientists have studied the development of the heart in animals like the zebra fish, but this finding will allow researchers to closely examine the genesis of human cardiac tissue in unprecedented detail.

(3) The location of these "master" stem cells in the human embryonic heart also offers insight into the basis of congenital heart diseases, in which newborns are born with structural defects in their hearts. The stem cells tend to congregate in areas linked with congenital heart disease, including the heart valves and pumping chambers. "Congenital heart disease may be a stem cell disease," Chien said [Reuters]. The researchers caution, however, that the cells the team discovered most likely cannot be used to produce an entire human heart because the organ is so complex. And although stem cell-based heart treatments have been used to repair heart tissue damaged during a heart attack, the cells used weren't these master cardiac cells, and it remains to be seen if such a method is feasible.

(4) Using these recently discovered cells within the human body will require extensive research, so the greatest near-term promise of the work might be in routine drug development. It could now be possible, for example, to create large numbers of heart muscle cells to test drugs.... Drug companies are especially interested in such applications. Using the actual human cells affected by a disease, instead of mice, dogs, or other stand-ins, could potentially speed up drug development by giving companies a more accurate template for screening potential drugs [Boston Globe]. Until now, animal cells have proven crucial to pharmaceutical research. But testing such drugs on actual human cardiac tissue could allow researchers to investigate treatments' effects on the cells that are actually the building blocks of the human heart.

Bond, A. (2009, July 3). Could Stem Cells Patch Up a Broken Heart. Discover Magazine. Retrieved from <http://blogs.discovermagazine.com/3dbeats/2009/07/03/could-stem-cells-patch-up-a-broken-heart>

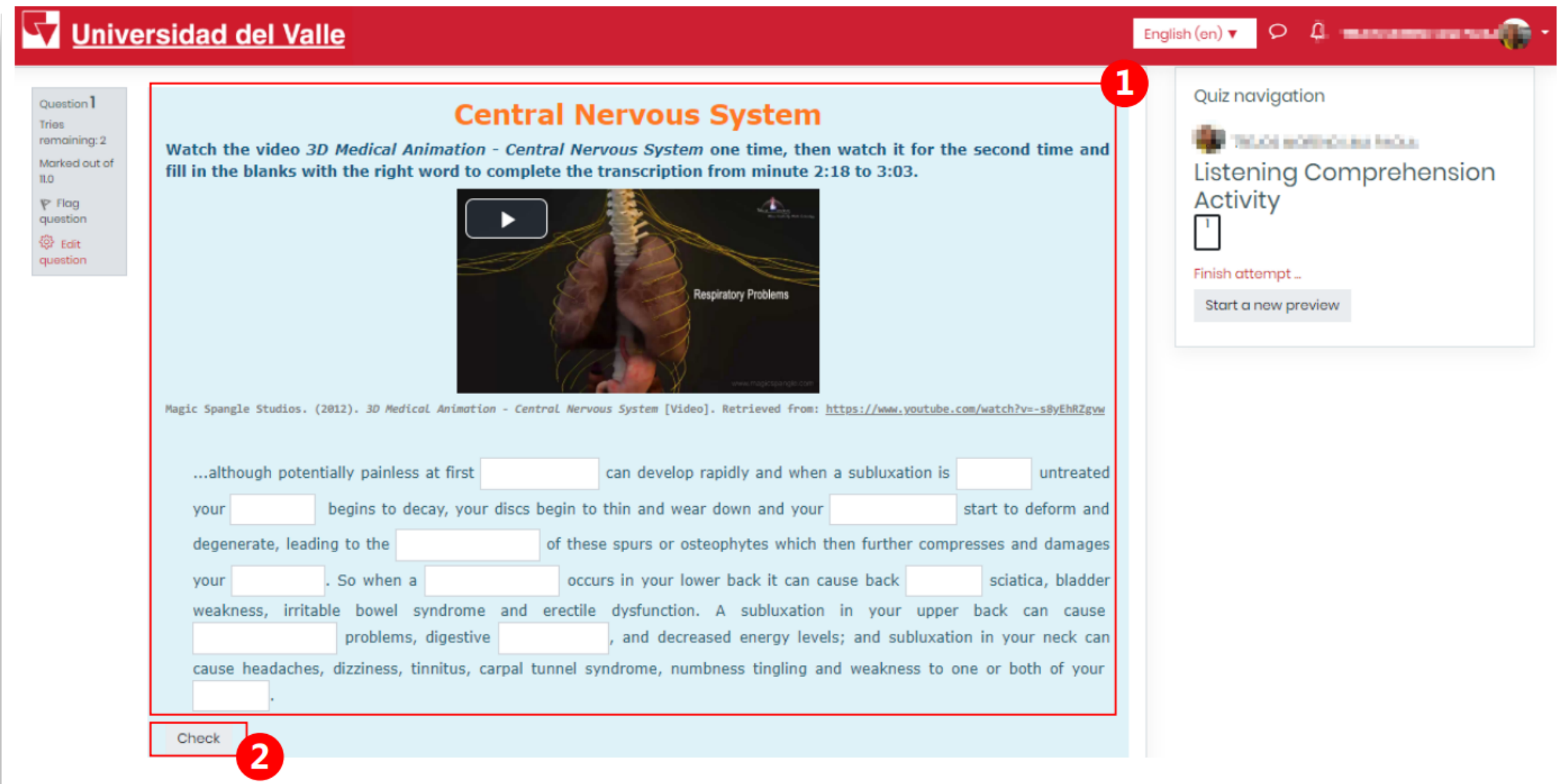
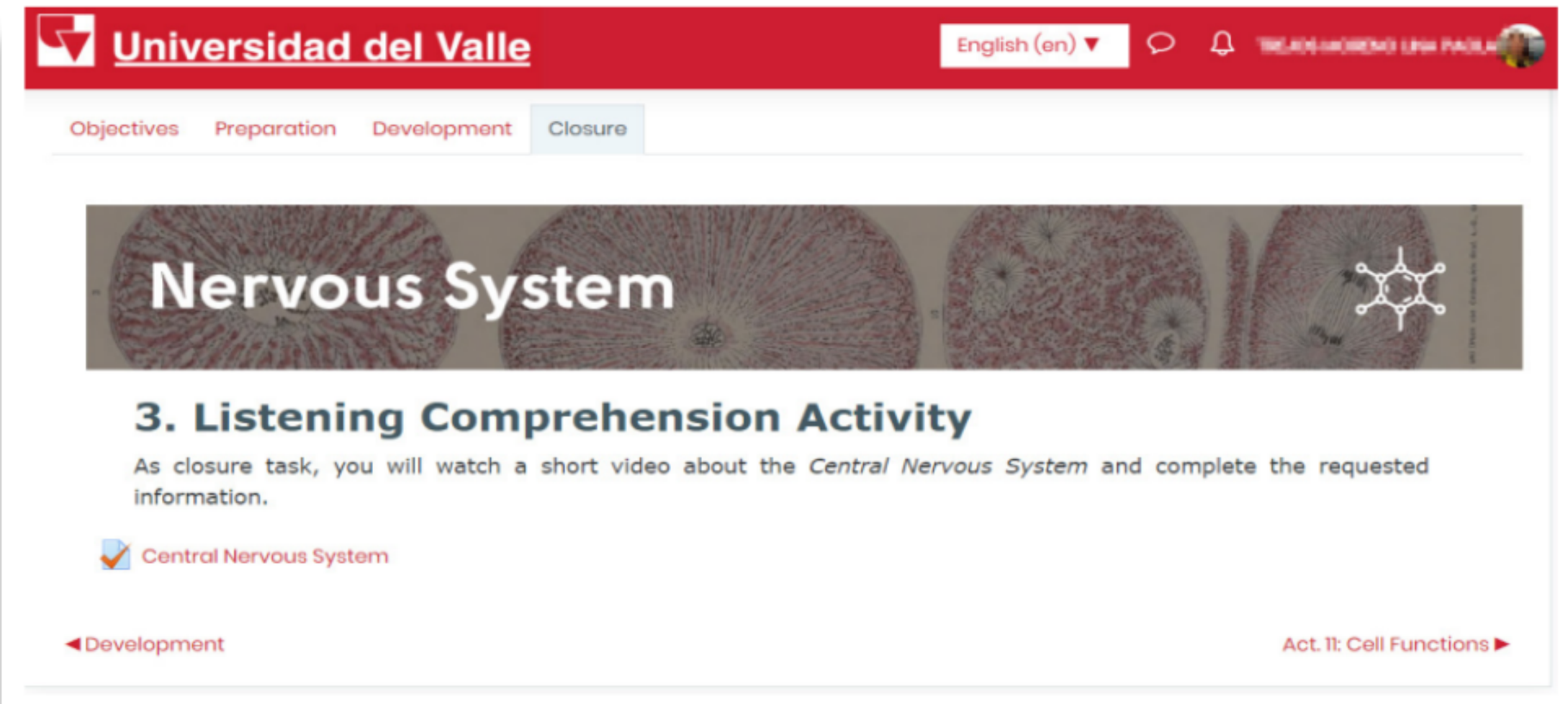
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1. Menú de Análisis Textual
2. Audio de la lectura
3. Botón para imprimir



El momento de **cierre** busca reforzar y/o ampliar los conocimientos adquiridos en las diferentes etapas de la actividad. Los estudiantes deben dar cuenta de lo aprendido mediante un producto final, que puede tener formato de respuestas abiertas, grabaciones, creación de mapas conceptuales, entre otros.

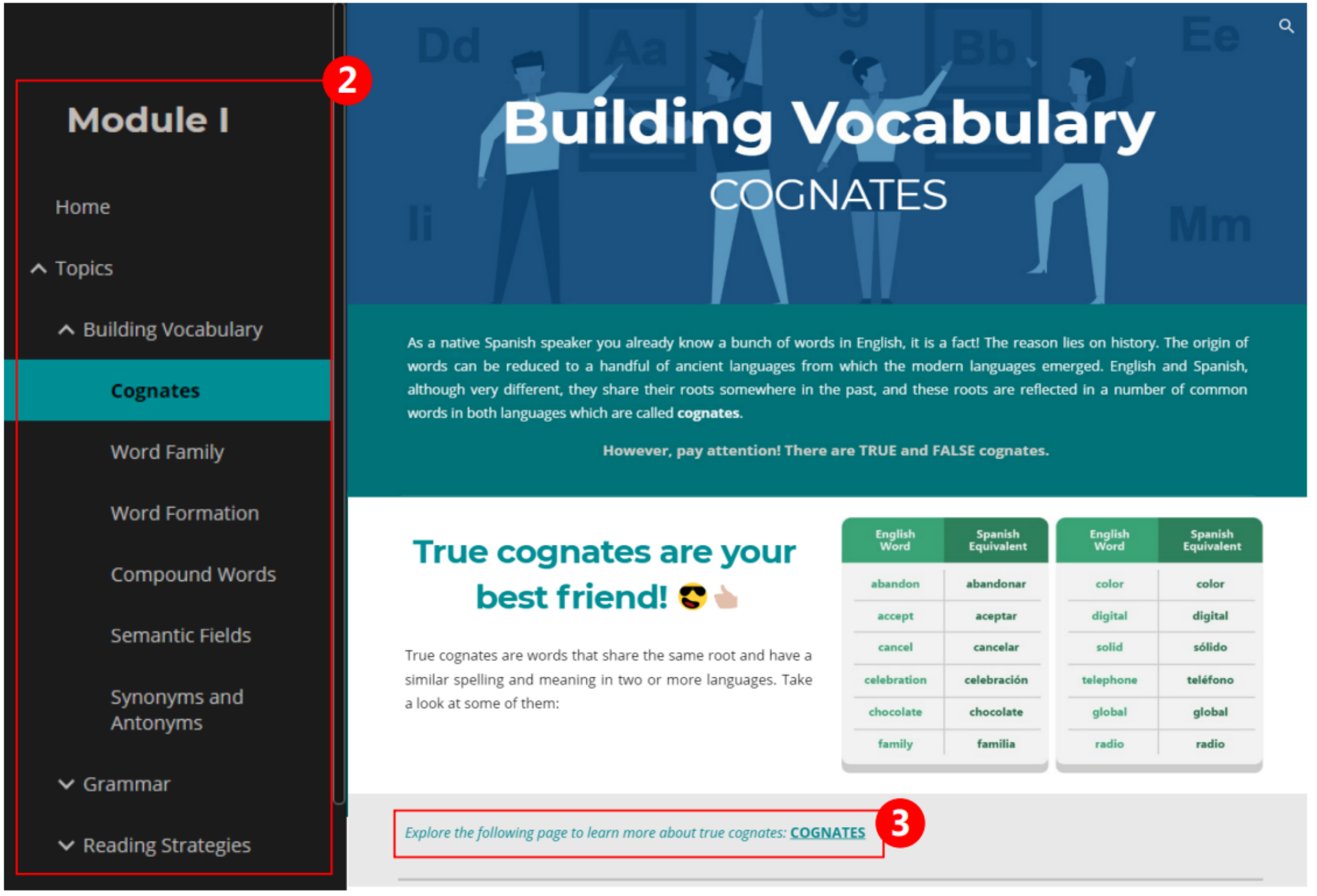
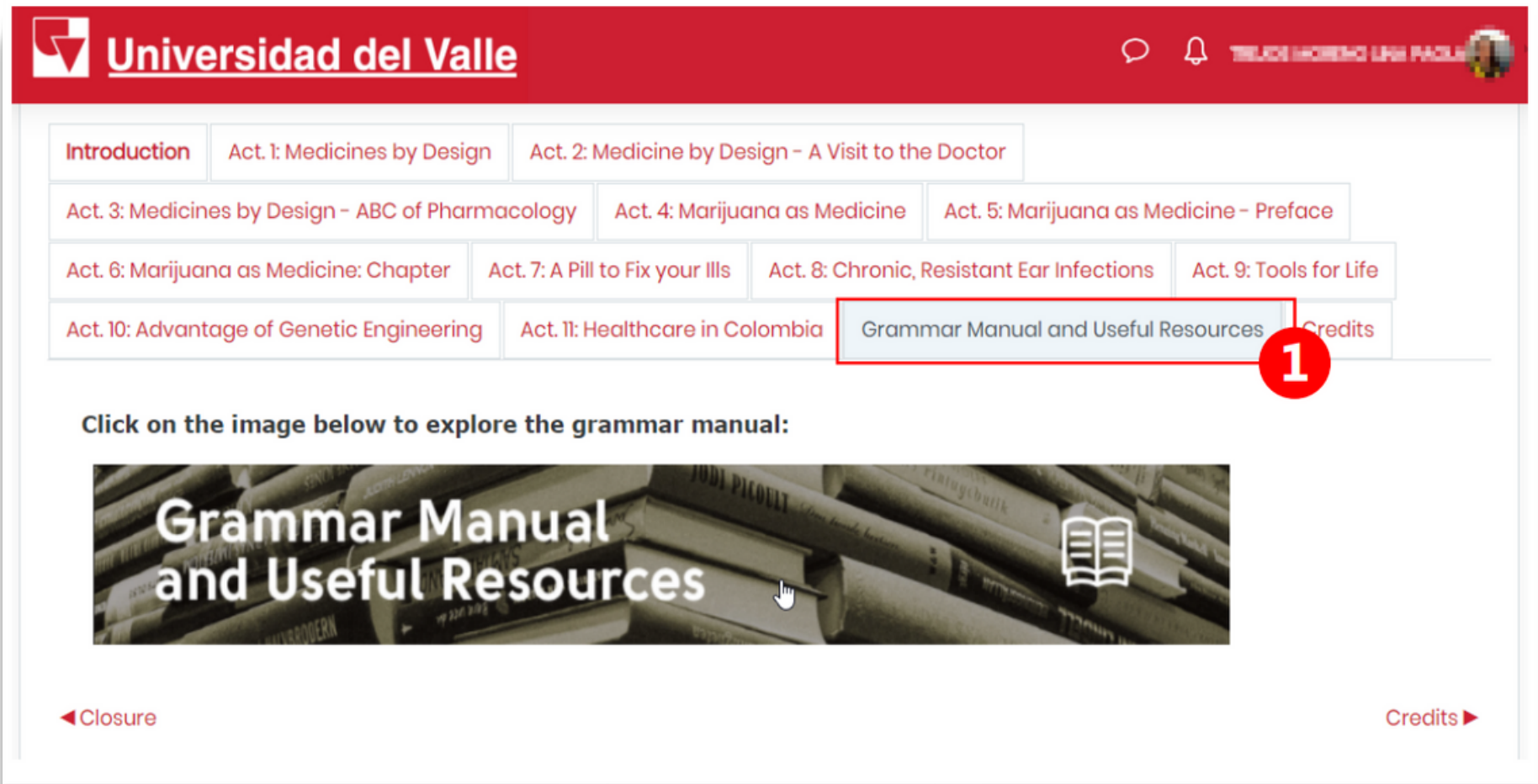


1. Ejemplo de un ejercicio del momento de cierre

2. Botón **Check** que le permite al estudiante comprobar la cantidad de respuestas correctas hechas. Sólo funciona con preguntas cerradas.

# Recursos Adicionales

En esta sección se encuentra el enlace directo a diferentes recursos adicionales como Building Vocabulary, Grammar, Reading Strategies y Reading Comprehension. Cada sección ha sido enriquecida con enlaces externos para profundizar o practicar la temática abordada.



1. Pestaña Recursos Adicionales

2. Panel de navegación de Recursos Adicionales

3. Enlace externo a actividades complementarias relacionadas con el tema tratado







Programa ditorial

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